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Psychogenic Abdominal Pain in Children

Psychoneurotic Versus Psychosomatic Abdominal Pain

Surgery of Duodenal Ulcer

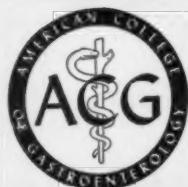
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*The Pioneer Journal of Gastroenterology, Proctology
and Allied Subjects in the United States and Canada*

contents:

| | |
|--|-----|
| Editorial Board and General Information | 118 |
| Psychogenic Abdominal Pain in Children.....JAMES MARVIN BATY, M.D. | 123 |
| Psychoneurotic Versus Psychosomatic Abdominal PainPHILIP SOLOMON, M.D. | 129 |
| Surgery of Duodenal Ulcer.....REGINALD H. SMITHWICK, M.D. | 145 |
| Diagnosis of Gastric Carcinoma Clinically Warranted, Laboratorily Uncon- firmed.....MEYER GOLOB, M.D. | 161 |
| Tuberculosis of the Digestive System.....N. B. JAFFE, M.D., F.A.C.G. | 173 |
| Clinical Evaluation of Paper Electrophoresis. IV. The Finding of Abnormal Protein Components in a Case of Virus Hepatitis and Laennec's Cirrhosis.....JOHN L. E. WOLFF, M.D., A. ALLEN GOLDBLOOM, M.D., F.A.C.P., F.A.C.G. and NICHOLAS BRITTS, M.D. | 179 |
| President's Message | 192 |
| News Notes | 193 |
| In Memoriam | 193 |
| Abstracts for Gastroenterologists | 194 |
| Book Reviews for Gastroenterologists | 205 |

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Index to Advertisers

| | |
|---|-----------|
| Ames Co., Inc. | 122 |
| Desitin Chemical Co. | 3rd cover |
| Lakeside Laboratories, Inc. | 212 |
| Mead Johnson | 119, 120 |
| Robins, A. H., Co., Inc. | 209 |
| Roche Laboratories, Division of Hoffmann-La Roche, Inc. | 114 |
| Rorer, William H., Inc. | 211 |
| Searle, G. D., & Co. | 115 |
| Smith, Kline & French Laboratories | 2nd cover |
| Squibb | 121, 208 |
| Wallace Laboratories | 206, 207 |
| Warner-Chilcott Laboratories | 4th cover |
| Winthrop Laboratories | 210 |

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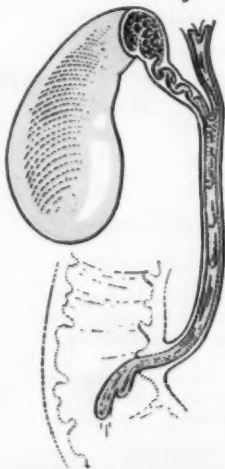
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PSYCHOGENIC ABDOMINAL PAIN IN CHILDREN*†

JAMES MARVIN BATY, M.D.

Boston, Mass.

Abdominal pain is one of the most common complaints in childhood. It is the presenting symptom in a long list of intraabdominal conditions beginning with appendicitis and extending through urinary tract abnormalities. It may be the initial complaint in systemic diseases such as rheumatic fever and leukemia. For this reason, neither the parent nor the doctor can ignore the child who says "my stomach hurts".

Many children, however, complain of abdominal pain who have no disease or abnormality to which the pain can be attributed. These children have interested us for years and as a group have constituted one of our most baffling diagnostic and therapeutic problems. We have recognized "colic" during early infancy as a special syndrome but it is poorly understood and probably has many causes. We are familiar with the 2 to 3-year olds who complain of transient abdominal pain but who are well otherwise. Their symptom is thought to be due simply to an increased awareness of normal intestinal activity. The child with school phobia who uses abdominal pain as the means of staying home poses no great diagnostic problem.

We would like to discuss here 43 children who were studied in The Boston Floating Hospital because of unexplained, recurrent abdominal pain during a 3-year period ending in June, 1955. This period of time has been selected in order that there might be a minimum of 2 years in which to evaluate the effect of the hospital experience on the course of the children. These particular children have been included in the study because of similarities, especially in the age at the onset of symptoms, the historical data and the response to treatment.

*Presented before the Course in Postgraduate Gastroenterology of the American College of Gastroenterology, Boston, Mass., 24, 25, 26 October 1957.

†From the Department of Pediatrics, Tufts University School of Medicine, The Boston Floating Hospital and the Children's Clinic of The Boston Dispensary.

These children, who came to The Boston Floating Hospital because of unexplained, recurrent abdominal pain, were studied by members of the Medical and Psychiatric Services working together and concurrently. In addition to the procedures which are done regularly on hospitalized children, the medical investigation included x-ray examination of the gastrointestinal and urinary tracts and any other special studies such as an electroencephalogram which seem indicated in the individual instance. The psychiatric evaluation included interviews with the child and with the parents, testing and observation of the child on the wards and in the playroom of the hospital. Before sending the child home a final conference was held by the psychiatrist and pediatrician with the family and the child.

Muriel, who came to the hospital at the age of 6½ years, is illustrative of the group to be discussed. She was referred for investigation because of recurring attacks of abdominal pain.

Her family consisted of her mother and father, a 9½-year old sister and an 11-month old brother.

The father was a tall, handsome man with a soft face and somewhat helpless attitude who appeared to be sensitive and introspective. He had had pains similar to his daughter's as a little boy, particularly when he felt unhappy and frustrated. About 2 years previously there was question of his being drafted into the Army. After this was settled, the company he worked for promoted him to a responsible job for which he did not feel adequate. During this period he gradually developed epigastric symptoms which "he kept to himself", and finally a bleeding ulcer requiring hospitalization for 10 days. Following this he returned to work in a less responsible position and had remained essentially well.

The mother was pretty and very tidy, a little bit too prim. She seemed to be sincere, well-meaning and quite defensive. She had been taken to the hospital in an ambulance because of a miscarriage when Muriel was 4 years old.

It was difficult to get realistic information about the child's early history as the mother obviously confused actual occurrences with what she had read in books and magazine articles on how to bring up children. She had been physically well but emotionally upset and unhappy during the pregnancy with Muriel as they were living with her mother with whom she did not get along well. The delivery had been a difficult breech and she had received very little anesthesia. While she was in the hospital another baby born by breech delivery had died.

Muriel was bottle fed. The mother said that there had been no feeding problems but was reminded by the father of spitting up after feedings and many formula changes. Later she became a fairly good eater but was always "picky". There were no training problems.

The parents described Muriel as a little girl anxious to please who was not aggressive and seemed to be upset by aggressive behavior of others. She had very few playmates and preferred to play alone. She had many fears such as fear of the dark and fear of poverty. For about five months she had been waking in the middle of the night and getting into her mother's bed with her. The mother, father and infant brother slept in one bedroom while Muriel and her sister slept in the other.

Muriel had been well and had had no illnesses except rare mild respiratory infections. About 10 months previously (shortly after the birth of her brother) she began to complain occasionally of abdominal pain but she appeared well and nothing was done about this. She started to school about 6 months before coming to the hospital. On the first day in school she became acutely ill with fever, abdominal pain and vomiting and was found to have acute tonsillitis from which she recovered rapidly on antibiotic therapy.

After this illness she returned to school and was thought to be well and happy. She then began having occasional episodes of abdominal pain during which she would appear pale and lay on the couch curled up without being restless, for about an hour. The attacks occurred only during the day and were not thought to be related to her diet, meal time or activity.

At the time of the illness a tonsillectomy was planned for about 2 months later. Her father returned from the hospital just a couple of days before Muriel had to go for her operation. She made a quick recovery and again returned to school but began having the attacks of abdominal pain more often so that she had to stay home or was sent home several days each week. She seemed unhappy at missing school and the attacks occurred during the weekends as well as on school days.

Nothing abnormal was found on physical examination and complete medical investigation. Muriel was an intelligent, attractive, polite and carefully controlled little girl. She was poised and obedient on the ward and in the playroom and showed no outward sign of insecurity or tension but her eyes betrayed her anxiety. She seldom looked into one's face, and talked about her father, blood and operations and said she did not know what was cut out when she had her tonsil operation. She also spoke of her fear of the dark.

It was felt that her pain was psychogenic and before she went home her physicians, including the psychiatrist, discussed the problem fully with the parents.

They and Muriel were assured that she was healthy and that there was no physical abnormality to account for her pain. The father was told that his fear that his ulcer might be hereditary and be the cause of his daughter's pain was ungrounded. During the discussion the parents, being reassured about Muriel's

physical condition, seemed to understand and were able themselves to relate the occurrences of the past 2 years to the development of her anxiety and tension which finally found expression in abdominal pain.

It was suggested that Muriel be sent back to school immediately and that the parents and teacher, while being kind, should reassure her that her pain was not serious and not cause for staying home. Also, the sleeping arrangement in the home was changed so that the 3 children were put into the larger bedroom and the mother and father took the smaller one.

Muriel returned with her mother 2 years later for a follow-up interview. She had been fine and doing very well at home and in school. She had complained of abdominal pain a few times at the beginning of the next school year but each time was easily reassured and the pain had not recurred.

Each of the 43 children included in this group had "complete" medical investigation and psychiatric evaluation while in the hospital. These studies revealed no evidence of disease or abnormality which might account for the symptoms. The children were all of normal intelligence and showed no signs of obvious personality disorder or emotional disturbance. A number of other children were studied medically in the clinic or the hospital because of unexplained recurrent abdominal pain during this period. They were not included in this group because although some of them were seen once in consultation by the psychiatrist they were not evaluated thoroughly for various reasons. In some instances there was not time for this but more commonly either the referring physician or the family did not desire psychiatric investigation.

All of these children began to complain of abdominal pain between the ages of 4 and 8 years, the majority at 5 or 6 years. Four of them were over the age of 10 when they were studied but they had been having recurring episodes of pain for 3 or 4 years which were either not severe enough or had not created enough anxiety to precipitate hospitalization. During the same period a few children were investigated because of unexplained abdominal pain beginning in pre- or early adolescence. They are not included in this group because the mechanisms underlying the development of the symptom seem to be different.

Recurring attacks of abdominal pain were responsible for the hospitalization in all of these patients. The pain was localized in the periumbilical area by the majority of the children and in the epigastrium or across the lower abdomen by a few. One or two complained of pain in the right lower abdomen. The character and duration of the pain varied considerably in the different individuals and at times in the same child. It was dull most commonly but was described occasionally as being sharp. The pain was momentary in some instances but frequently lasted 15 or 20 minutes and rarely as long as an hour although some of the children said they had a more or less constant dull ache. The complaint frequently occurred in "attacks" lasting one to several days

alternating with periods of days to weeks during which the child was symptom-free. The pain occurred at all times of the day and did not seem to be related to meals or individual foods. In only one instance did the child complain during the night and he apparently was not awakened by the pain. Vomiting occurred occasionally but more commonly the children expressed the fear of vomiting without actually doing so. There were no associated bowel or urinary symptoms.

Each of the children had been examined by their physicians during attacks of pain and several had had previous hospital admissions for observation.

The family history of these children is interesting because of a certain degree of consistency, in that there was a "pain climate". In each family one or more close relatives, frequently one of the parents, had been having pain of some sort for years. Pains attributed to ulcers and actual peptic ulcers, recurrent abdominal pain, abdominal operations, chest pain and frequent incapacitating headaches were most commonly encountered.

The personal history of these children revealed feeding difficulties in almost every instance during the first 3 months of life which did not interfere with normal gain in weight. There was excessive crying and most of them had what the parents described as colic. They were "spitters", vomiting small amounts of food frequently. And they had all had several changes in formula during this period. After this most of the children were described as "good eaters" and there were no particular problems.

Almost all of these children were characterized by their parents as worriers—they were worried about their school work and fear of failure and about the family finances. They also had many fears, such as of the dark and of death.

The treatment of these patients consisted simply of reassuring the child, the parents and the family physician. This was accomplished in part during the period of observation by telling the child and the parents that the tests were negative as they were done. After the investigation had been completed a conference was held by the pediatrician and psychiatrist with the child and the parents during which the entire problem was discussed in detail. The purpose and results of the various procedures was explained and assurance given that there was no evidence of underlying abnormality which could be altered by medical or surgical treatment. They were told that while the exact mechanism of the production of the pain was not understood, it originated in some way because of worry and tension and that even if the pain recurred from time to time (and that it probably would) that it should not cause concern or be allowed to interfere with the child's activities. The questions raised by the child and the parents were dealt with candidly and they were offered the opportunity to return for further discussion if the need arose. They were also advised to inform the child's school teacher of the hospital experience and recommendations.

The result of treatment in this group of 43 children was uniformly good as measured by short term follow-up. In all instances the pain became "no problem", either being mild and sporadic afterwards or disappearing entirely.

SUMMARY

The observations on a group of 43 children with psychogenic abdominal pain are reported.

These children had recurring, episodic pain which began between the ages of 4 and 8 years and could not be explained by disease or abnormality. Pain was a common complaint in their families. The patients had had feeding difficulties during the first 3 months of life and they were fearful, worrying youngsters but were otherwise normal.

The pain did not recur or was unimportant following investigation and assurance that the child was physically healthy.

PSYCHONEUROTIC VERSUS PSYCHOSOMATIC ABDOMINAL PAIN*

PHILIP SOLOMON, M.D.†

Boston, Mass.

INTRODUCTION

Terminology in medicine has always been a source of dissension and misunderstanding. In a relatively new field like psychiatry where the subject matter in itself is still abstruse enough, terminological ambiguity is particularly distressing. There has been a sort of fashion in synonyms for "neurosis". The early forms "neurasthenia", "actual neurosis", and "hypochondriasis" gave way to "hysteria", "psychoneurosis", and "vegetative neurosis". Later, these were replaced by new favorites, "organ neurosis", "functional conditions", and finally "psychogenic" and "psychosomatic" disturbances. The current phraseology is eminently acceptable and indeed any phraseology is acceptable if it is used properly, but with the advent of "psychosomatic" a new understanding has come into the field where psychiatry and internal medicine overlap, an understanding that sometimes requires the critical differentiation between "psychosomatic" and "psychoneurotic" for the protection of the patient. Loose usage, with its underlying faulty knowledge, is no longer tolerable, since it may seriously jeopardize the welfare or even the life of a patient.

The term "psychogenic" encompasses both "psychosomatic" and "psychoneurotic", referring, as it does, to psychic origin of whatever sort. This is the term of choice when one wishes to indicate uncritically the psychic or non-organic nature of a condition. "Psychosomatic" refers to somatic effects brought on by the *direct* action of emotions, while "psychoneurotic" should be restricted to effects brought on *indirectly* through symbolic action. That this is not mere quibbling will become evident shortly when we discuss psychogenic abdominal pain.

The distinction between "psychosomatic" and "psychoneurotic" should be clarified further. *Psychosomatic* symptoms and signs are brought about whenever emotion affects the organism through the intervention of the autonomic nervous system. Familiar examples are increased pulse, respiration, and blood pressure in excitement; dry mouth and dilated pupils in fear; and blushing in embarrassment. All of these are appropriate in making a speech. *Psychoneurotic* symptoms and signs come about through the action of the voluntary nervous system when unconscious emotional conflicts obtain symbolic solution through the use of some organ or function of the body. A typical example is the paralysis

*Presented before the Course in Postgraduate Gastroenterology of the American College of Gastroenterology, Boston, Mass., 23, 24, 25 October 1957.

†Assistant Clinical Professor of Psychiatry, Harvard Medical School; Physician-in-chief for Psychiatry, Boston City Hospital.

of the legs of a soldier who wishes to fight honorably alongside his fellows, but who can no longer bear up under the terrors of combat. No special muscle groups are paralyzed, but the entire "legs", the symbol of entrance into danger, give up.

Notice that psychosomatic symptoms usually involve *over*-activity of a function, as increased pulse, etc., though there may be inhibition also, as diminished salivary secretion. Psychoneurotic symptoms, in our restricted usage, characteristically involve *loss* of function, as loss of muscle strength, loss of vision, etc. Psychosomatic effects may be useful physiologically, as when emergency reactions in the cardiorespiratory system assist in "fight or flight", or they may be a hindrance, as in the dry mouth of the public speaker. In any event, they do not in themselves materially alter the patient's emotional reaction. If the patient is anxious or fearful he remains anxious or fearful. In psychoneurotic reactions the situation is different. The symptom, being a kind of solution, though not the best, for the emotional conflict, eases the patient's anxiety. The soldier

TABLE I
DISTINGUISHING FEATURES BETWEEN PSYCHONEUROTIC AND PSYCHOSOMATIC SYMPTOMS

| | Symptoms via | Nervous system | Anxiety |
|----------------|-----------------|-------------------|---------|
| Psychoneurotic | Symbol | Voluntary | Absent |
| Psychosomatic | Emotion | Autonomic | Present |

with paralyzed legs does not look very worried about his predicament; he might even seem a bit relieved.

None of what has been said above is really new. Franz Alexander¹ was among the first to stress the distinction referred to. Szasz² has applied it to the problems of constipation and diarrhea. The emphasis here has been in presenting the material in simplified form so that it can be useful in the practical gastroenterological problem which follows. Many of the points which have been made may be seen in tabular form in Table I.

PSYCHONEUROTIC ABDOMINAL PAIN

Every experienced internist knows that abdominal pain is a frequent complaint for which organic disease may not be accountable. After all the physical and x-ray examinations are completed the patient may be left without relief and the doctor without a diagnosis. The particular label or comment to which the doctor now resorts depends mostly on the year in which he graduated from medical school and the professional company that he keeps. One hears such

opinions as, "nervous stomach", "touch of hysteria", "You need a rest", or simply "There's nothing wrong with you." Treatment usually consists of phenobarbital, belladonna, various proprietary "shot-gun mixtures", or lately, one of the more innocuous tranquilizers. Soon the patient has passed through her temporary improvement and is probably off to another doctor.

What is the proper management? The principle of casuality is as applicable here as in organic problems. Notice the following case:

Case 1:—Joan, a 17-year old girl complained of abdominal pain of several weeks' duration. The pain was usually located in the center of the lower abdomen, but it varied at times to either right or left. It was dull and cramp-like in character, but sometimes became very sharp and made Joan cry out. The severity varied; on some days it was hardly noticeable but most of the time it was present all day and kept Joan from engaging in her usual activities. The pain was usually at its worst in the evenings and Joan stopped going out on dates because of it.

The past medical history was noncontributory. Joan had had the usual childhood diseases. She had a tonsillectomy at 9 because of frequent sore throats.

The family medical history was also essentially negative. A maternal uncle was a chronic alcoholic and a paternal great-aunt had been in a mental institution for a time.

Joan was the youngest of 5 children, the oldest 3 being boys who were long-since married and had families of their own. Sister Ruth was 22 and had been married a little over a year ago. None of the children had gone to college but Joan was now in her senior year of high school and was taking the college preparatory course. She was a good student and was planning to be a teacher.

The family doctor had known the family for many years and was familiar with this background material. When he examined Joan he noted that all findings were negative except for the abdomen. Joan made a great fuss about having her abdomen palpated. She squirmed, resisted, and cried out. During her struggles the bedclothes went awry and she became almost completely exposed but did not seem to notice it. When the physician engaged her in conversation about school, college plans, and social matters, Joan became interested and was unaware of the palpation of the abdomen, which then seemed soft and relaxed, with no tenderness or masses.

The doctor remarked to Joan that she seemed unusually tense, and he asked if anything had been upsetting her lately. Joan said no, she did have some exams coming up at school pretty soon but she didn't think she was that worried about them. The doctor chatted a bit longer, but found nothing of importance. He told Joan and her parents that he didn't think there was anything organically wrong, but he would do a few tests and then follow her along for a while. If it

was nervousness perhaps it would soon subside. He examined a urine specimen and did a routine blood, both of which were negative.

Two weeks later Joan's pains were worse. Further questioning and physical examination were much as before. The doctor ordered a gastrointestinal x-ray series and barium enema. When both were reported normal, he prescribed a small dose of belladonna with phenobarbital and asked Joan to return in a week. When she returned she was no better, and complained in addition of dry mouth and drowsiness. The doctor had a talk with Joan and her parents, explained that he was convinced Joan was organically sound, but that disturbed emotions could produce just such a clinical picture, even if the patient was not aware of what she was disturbed about. He pointed out that there were really three kinds of illnesses—physical, mental and emotional. He was sure Joan was all right physically and mentally, but he would like a specialist to examine her from the point of view of her emotions. The family agreed and Joan was referred to a psychiatrist.

In the first psychiatric interview Joan was clearly embarrassed at being in a psychiatrist's office. She made a few flippant remarks about the couch and asked if she could try it. When she was told she could, she gingerly lay down on it but quickly bounced up and returned to her chair. She talked about her abdominal pain and seemed a little surprised that the psychiatrist showed no great interest in it. "That's what I'm here for," she said. "Are your family worried about it?" the psychiatrist asked. The interview then proceeded to topics concerning the family background.

In the second interview, Joan talked more about her family and about her school life and friends. It was not until the sixth interview that emotionally charged material was elicited. Joan had mentioned a certain boy before, a handsome football player, but now she spoke of recent dates with this boy and of his attempts at more intimate love-making. A little later she mentioned that she knew a secret: her sister, Ruth, was going to have a baby. Ruth was not going to tell anybody, not even her parents, until it began to show, because she didn't want to be fussed over any longer than she could help, but she told Joan. She often confided in Joan, perhaps a little boastfully, regarding her personal life.

The rest of the psychiatric development of this case need not be gone into in detail. The psychodynamics became clear after the interview just mentioned. Joan, like most adolescents, was very much concerned about her coming adult status. She had been told the "facts of life" both at home and at school, but this knowledge while interesting was remote and bookish. Now she was finding out a thing or two at first hand and this was so very different! This was fascinating and almost overwhelming, but also appalling and threatening. What if she got pregnant? True, what had taken place was only the mildest kind of caressing, but how could one be sure? Nobody knew sister Ruth was pregnant and yet she was.

The reasoning in such cases is hardly Euclidean. The immature intellect is no match for the storming conflict of emotions. The patient's instinctual desire for sex and pregnancy clashed fiercely with her moral code and fear of the consequences. All adolescents face this dilemma and find solutions, some good, some bad. It is only the occasional adolescent who resorts unconsciously to a symbolic solution through symptom formation. In Joan, the abdominal pain represented both the fulfillment of her desires, since she connected both sex and pregnancy with pain, and the punishment for them.

The conclusion to Joan's case is brief and pleasant to relate. Following the sixth interview and even before Joan brought out the full extent of her turmoil, she no longer spoke to the psychiatrist about abdominal pain. By tacit agreement neither she nor the psychiatrist mentioned the subject and the symptom disappeared by default, as it were. In the twelfth and last interview the psychiatrist remarked in passing how easy it is to get tense and feel pain in the part of the body you are concerned about and Joan nodded and that was the end of it.

Unfortunately, not all psychoneurotic problems respond as readily to psychotherapy as did Joan's. Generally speaking, young people do well quickly. Older people, and particularly those with symptoms of long duration, may be much more resistant. Even here, however, the maxim, "If the cause is psychological, the treatment must be psychological" holds. Flashy "cures", such as shrines, most hypnotic seances, impressive medication, fake operations and the like, work if they work at all through their psychological effects. Since these methods utilize bad psychology, the effects are apt to be uncertain and evanescent. Only a psychological approach which attempts to understand the basic motivations of the patient, both conscious and unconscious, can offer the possibilities of true emotional resolution of conflict and thus lasting change, growth and cure.

PSYCHOSOMATIC ABDOMINAL PAIN

If patients with psychoneurotic abdominal pain are improperly managed they merely proceed to become chronic, often with repeated abdominal operations as part of the consequences. Patients with psychosomatic abdominal pain may be far more serious. Witness the following case:

Case 2:—Mrs. K., a 52-year old married woman, was brought to the hospital unconscious following the ingestion of some 20 half-grain codeine tablets. She had made a serious suicide attempt because of despondency connected with her illness.

Mrs. K.'s illness began several months earlier with the onset of right lower quadrant abdominal pain. The pain was cramp-like in nature, fixed in location, and associated with superficial local tenderness around a scar at McBurney's point. The severity of the pain varied; it was never absent, nor did it ever

double the patient up. The patient favored her right side physically. She had to give up golf because the exercise increased the pain.

Mrs. K had seen several doctors because of her pain. Two surgeons wanted to operate for "adhesions" supposedly present at the site of her appendectomy. Two internists advised against operation, pointing out that 12 months previously, a normal appendix had been removed following a similar clinical picture. A third surgeon wanted to operate if only for psychological effect, arguing that the first operation had relieved her for a year in spite of the normal appendix. Everyone recognized that Mrs. K. was a tense, grim-faced woman and that her illness had become her major interest in life, but no one suggested a psychiatric consultation. Finally one doctor prescribed codeine and soon Mrs. K. was taking half-grain tablets 6 or 8 times a day. Her pain became more bearable under the influence of the drug, but as soon as the effect wore off the pain became worse than ever and Mrs. K. demanded more codeine in a most insistent fashion. It was after several weeks of increasing dependence on codeine that the suicide attempt occurred.

During the course of the psychiatric study that followed the patient's admission to the hospital, the following story was elicited: The patient had been born in Eastern Europe and had come to the United States at the age of 12 with her family. She was the second child and oldest girl in 6 children. She and her older brother both had to sacrifice their education, he to go to work and help financially, she to help her mother with the house and younger children. At 19, largely to get into a home of her own, the patient married Mr. K., a recent immigrant from a nearby village in the "old country". Together they opened a small retail store and lived in one room at the back.

The business thrived and after their second child was born they moved into a small apartment and opened a second store. By the time the fourth child was born, Mr. K. had a chain of 9 stores and had established his family in a home of their own. Mrs. K. had a maid but she still did her own cooking and whenever she had any spare time from her own children she helped her brothers and sisters with theirs. Mrs. K. was a hard-working woman and she had plenty to do.

When she reached her early 40's, Mrs. K. was living in a new home that Mr. K. had built for her and there were two servants. The children were grown up, the oldest already married and the youngest in high school. Mrs. K.'s brothers and sisters were also doing well and began to look on Mrs. K.'s attempts to help them as interference. Mr. K. was now the president of a large chain of stores. He spent a good deal of time away from home at meetings and conventions, usually without his wife. Mrs. K. was finding time hanging heavy on her hands and this made her irritable. She and her husband frequently quarreled over trifles and their sex life dwindled to practically nil. Mrs. K. tried organizational work but she chafed at taking orders from others and, because of her irascible manner, her few chances to be a leader herself were not very successful.

As Mrs. K. approached 50 life began to pall on her. Even trips to Florida in the winter and Europe in the summer brought little zest. She began to suspect her husband of infidelities. On one occasion she had pretty good evidence with regard to a young secretary and Mr. K. had to discharge the girl to keep peace in the family. The menopause came on and brought with it stormy circulatory symptoms. Mrs. K. had always been in robust physical health and her suffering brought sympathetic attention from her somewhat guilt-ridden husband. He took her to several doctors in an effort to bring her relief.

Finally, at 51, Mrs. K. was well again and she started doing volunteer work at a children's institution. It was at this point that she obtained positive proof of her husband's infidelity with another secretary, an older woman this time. There was a great row and she would not forgive him even after he discharged the woman. She insisted that he leave the home and, life with Mrs. K. being what it was, Mr. K. did leave. It was now that Mrs. K. began having her first attacks of right lower abdominal pain.

When Mrs. K. had her appendectomy it was a momentous event for the whole family. She had never been in a hospital before except to have babies. Mr. K. surrounded her with flowers and there was a reconciliation. For a few months thereafter things went smoothly.

Soon friction developed again due to Mr. K.'s unwillingness to give up his own apartment. He insisted it was on lease anyhow, and besides it was convenient to stay there overnight when he had late meetings in town. But Mrs. K. could now afford private detectives, and it was not long before Mr. K. had to move out once more. The return of the abdominal pain came shortly thereafter, and thus the further "doctoring", the codeine addiction and the suicide attempt.

It would be beyond the scope of this paper to proceed much further with the psychiatric developments of Mrs. K.'s case. It is sufficient to mention that in the hospital work-up no organic disease was found and the primary diagnosis was felt to be depression. The patient responded well to electroshock therapy, the abdominal pain disappearing after the fourth treatment. Subsequently she undertook a long course of supportive psychotherapy, and after a few brief recurrences of the pain it ceased altogether.

The significant feature of a case like Mrs. K. is the fact that the abdominal pain serves as a *mask for depression*. If treatment is directed simply at the pain it may be successful if by coincidence it also serves to remove the cause of the depression. It was thus that the appendectomy helped Mrs. K. when it temporarily brought her husband back to her. More often, treatment directed at the pain will fail and may even bring on complications that are worse than the pain, such as drug addiction. The most serious danger in concentrating on the pain and overlooking the underlying depression is that the depression goes untreated and becomes worse following the accumulation of one after another unsuccessful medical treatment. Many such a patient thus goes on to suicide.

A word about the mechanism of psychosomatic abdominal pain. A word is enough and that word is "unknown". When more cases of this type are recognized, opportunities will become available for investigative procedures that can throw light on the problem. It is easy to speculate that the pain is due to smooth muscle contracture or spasm, which it probably is, but there are other possibilities. Probably no two cases are alike and in some there may be blood vessel distention or spasm, cardiospasm, pylorospasm, angioneurotic edema, or other mechanisms as yet unrecognized.

Can other emotional states besides depression trigger such a mechanism? Probably so, but again we need more thoroughly studied cases. It is likely that an element of emotion of a negative sort must be involved, such as anger,

TABLE II
DIFFERENTIAL FEATURES BETWEEN
PSYCHONEUROTIC AND PSYCHOSOMATIC ABDOMINAL PAIN

| | Psycho- neurotic | Psycho- somatic |
|---|---------------------|--------------------|
| History—replete with tension, agitation, insomnia | — | + |
| Appearance—irritable, grim, restless, anxious | — | + |
| Suicidal or psychotic tendencies | — | + |
| Pain, Tenderness fluctuate with attention | + | — |
| Symbolic meaning of pain | + | — |

+ = often present

— = usually absent

aggression, hostility, or rage, but instead of depression, guilt, shame or disgust may be the predominant feeling-tone. For all practical purposes, the physician may keep depression in mind as the condition to look for, since it is depression that accompanies most of these other emotional states and is the prime offender psychosomatically.

DIFFERENTIAL DIAGNOSIS BETWEEN PSYCHONEUROTIC AND PSYCHOSOMATIC ABDOMINAL PAIN

The above two cases illustrate the thesis propounded in the introduction to this paper, namely that the distinction between psychoneurotic and psychosomatic abdominal pain is important because of the decidedly different management which may be necessary in the two instances. The differential diagnosis

is usually suggested strongly by the history. In *psychosomatic* abdominal pain there is a history replete with evidence of unresolved tension, agitation and misery. The patient and her relatives will usually offer abundant testimony of the patient's emotional discomfort and unhappiness. Weeping, insomnia, and inability to perform the usual daily tasks are the rule. In *psychoneurotic* abdominal pain, the emotional picture is quite different, at least superficially. Aside from complaints about the pain the patient is apt to seem content, even placid or indifferent to her situation. She may utilize her pain and medical incapacity ingeniously to gain her own ends with her family and friends. Tension and unhappiness are far from evident. Only on deep psychiatric probing can conflict be found and anxiety brought out.

In the examination too, the emotional differences just mentioned are usually obvious. The patient with *psychosomatic* abdominal pain characteristically looks grim, and tense, and shows restlessness, irritability, and agitation. The patient with *psychoneurotic* abdominal pain may show the *belle indifférence* of the classical hysteria patient, or may be flippant, gay, or coquettish. In any case, she is not likely to be miserable and unhappy. Also, in the former, palpation of the abdomen produces constant findings, usually tenderness and resistance but no involuntary spasm or rebound phenomenon. In the latter, the reaction of the patient depends greatly on her momentary attitude and on whether or not she can be distracted from the preoccupation with the pain.

The course of illness and the deeper understanding of the individual also offer material of value in the differential diagnosis. In *psychosomatic* abdominal pain we deal with a human being in serious emotional distress, in whom the ordinary defenses and even most of the emergency resources have failed. The abdominal pain with its silent plea for help may be all that stands between the patient and psychosis or suicide. In *psychoneurotic* abdominal pain we have a human being who has found a kind of answer to her problem, a symbolic answer, and one that is not altogether satisfactory, but an answer nevertheless that provides surcease to care and freedom from anxiety.

Much of the material in this section has been condensed and illustrated in Table II.

May I point out in closing that organic disease is an entity which I acknowledge and respect? The psychiatric approach should never be regarded as a substitute for the organic, but as a supplement or accompaniment. I am sure that as gastroenterologists you would regard it as a tragedy if, through the overlooking of a mental disturbance, a patient came to grief. As a psychiatrist, I would regard it as an equal tragedy if, through an overzealous interest in a patient's psychological problems an organic illness were overlooked. The possibility of organic illness must never be forgotten even when it has been ruled out as well as clinical and laboratory medicine permit at any cross-section of a patient's life. What is undetectable today may grow insidiously and be fatal

tomorrow. As physicians we have always known this and we must never lose sight of it. In this respect, psychiatrists must remain physicians. What I urge in this paper is that physicians should also, a little, become psychiatrists.

SUMMARY

Psychosomatic symptoms are not the same as psychoneurotic symptoms. The differences are explained and presented in condensed tabular form. In abdominal pain it may be vital to distinguish the psychosomatic from the psychoneurotic types. Case illustrations are given of each and the differential diagnosis is discussed. The salient features are presented in a table.

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DISCUSSION

Dr. O. H. Wangensteen:—We have heard two very interesting papers, as I think you will all agree.

Now, *The New Yorker* would have us believe a psychiatrist's life is a dull one. I suspect maybe some of you feel as I do after having heard Dr. Solomon, that we can hardly wait for the next chapter.

It is of great importance to differentiate sharply and accurately, if possible, between psychogenic pain and pain occasioned by organic disease.

In children, I have seen in earlier years, with some of my pediatrician colleagues, youngsters who gave a story of recurrent abdominal pain. The pediatrician often was disposed to look upon such attacks as being essentially non-surgical. Occasionally, in the early years of my surgical experience I would see the children of some of my colleagues when the pediatrician was not available. Being a surgeon, I was more aggressive in outlook upon such problems and frequently advised appendectomy, even though the child apparently had survived many similar attacks without operation. It was amazing how often we really did find a swollen and distended appendix at operation under those circumstances. Another item which bears on the point was how often the mothers of those children told me later that the appendectomy had put an end to the trouble and that her John or Mary had no more recurrent attacks of abdominal pain. I am reassured by situations like these that, on good indication, one should not be hesitant in advising appendectomy.

I do not condone unnecessary surgery, but I think if a reasonable examination cannot exclude acute appendicitis as the cause of acute or recurrent abdominal pain, operation should be undertaken.

My occasional contacts with psychiatrists lie largely on the therapeutic side, in situations where they have treated the patient over long periods of time for entities like ulcerative colitis, regional ileitis, or something of that sort, and usually rather unsuccessfully, judged from my point of view. That is often the reason why a consultant is called in. No physician should speak too harshly of his colleagues for we all live in thin glass houses in which the windows are readily shattered by the throwing of pebbles. Yet, it is very important to be frank in these discussions.

A few years ago, I saw a young lady who had been treated for regional ileitis and her chief complaint was pain. She had been eight years under psychiatric treatment and finally was given up by the psychiatrist as a therapeutic failure. The patient was full of pent-up emotion. One could scarcely get in the door to look at her without feeling the resentment which radiated from her. When she was rid of the organic disease by excision of the terminal ileum (40 cm.) and ascending colon, she was a different person. I have seen her in the out-patient clinic intermittently and she has remained well for a period of approximately ten years.

A close friend of my family was treated not so long ago in New York by a psychiatrist for many problems amongst which medley there was also diverticulitis of the sigmoid colon. The patient had suffered some business reverses and he had been through a few trying domestic problems all of which he seemed to be surviving. Recurrent attacks of abdominal pain was his fundamental problem. While still under treatment for the abdominal pain by the psychiatrist, a diverticulum in the colon perforated; acute peritonitis supervened and despite eleventh-hour surgery my friend died. A more realistic adjudication of the situation accompanied by a well timed (that is, an early) operation could have forestalled this unhappy and unnecessary occurrence, which snuffed out a potentially useful life before its time. My friend would still have had to find an adequate solution for some of his problems and sometimes these can be more difficult to resolve than organic disease which can be removed by operation. Yet, my special point is that getting rid of coexisting organic diseases frequently dissolves the emotional problems.

I talked with a surgeon last week at a meeting in Atlantic City about a patient admitted to his hospital during the night. She was a widow. There had been many antecedent operations. Three weeks before a hysterectomy had been done. The surgeon called the patient's physician who lived in Philadelphia. He said, "There is nothing the matter with that girl. Don't send her back to me. I do not want to see her again."

With this advice the surgeon dismissed the patient and she left the hospital. The very next morning she was back, and was operated upon for the removal of a segment of nonviable gangrenous bowel. Even emotionally disturbed patients can have organic diseases. In some patients, it is probably at the basis

of the unusual behavior. The patient probably is trying to call attention to his difficulty, the nature of which he himself does not comprehend. Most of us are inarticulate over things we fail to understand even concerning our own illnesses, though most of us would be silent and affect an air of composure and outward concern, until we had a better grasp of the situation.

Functional and organic problems may coexist side by side at the same time. I am fully persuaded, from what I have seen, that the psychiatrist will probably not make much headway treating emotional problems if coexisting organic disease is not given the important consideration it merits, even including the attentions of the surgeon.

I would like to cite one more case. It concerns a woman in her early fifties who had esophagitis; she also was catatonic in her behavior and refused to talk to anyone. There were a few coexisting conflicts between mother and daughter. I had the feeling, however, that the patient's esophagitis had an organic basis: reflux of an active acid peptic secretion from the stomach into the esophagus, I thought, was her basic problem and the thing to do was to correct this cause of her esophagitis. A period of psychiatric treatment had been of no avail. To make a long story short, this unhappy catatonic woman has now been completely well for more than five years, because we got rid of the organic basis of her difficulty. My feeling is there is only one solution for the problems of man. That chemical solvent is sympathy. Kindness and sympathy in another man's trouble the surgeon must have. The psychiatrists had treated this patient unsuccessfully for a long time. I did a gastric resection and gave her a pyloroplasty, believing that a reflux of gastric juice into the esophagus accounted for the esophagitis. Following operation she began to swallow a great deal better. My colleagues then wanted to send her back for more psychiatric treatment. I said: "No, I think we can manage the situation. Treat her with an attitude of unfeigned kindness and sympathy." We then got a social worker on the job to look into the home situation and encouraged the daughter to be especially kind to her mother. When I occasionally see this patient in the out-patient clinic twice a year, as I am wont to do, in the case of diseases in which I have an interest, I find real pleasure in recounting that the compensations of a surgeon can be great.

Now this I grant is a picture drawn from the surgeon's point of view. The psychiatrist can be of great help to us in diagnosis, and in the management of certain disorders, both on the diagnostic and therapeutic side. But where there is organic disease, it must be corrected or removed. Many emotional problems then disappear.

Dr. I. Snapper:—A large part of the difference of opinion which exists between psychiatrists and physicians can easily be removed if one goes down as Dr. Solomon says, to semantics.

The progress in gastroenterology which has taken place in the course of the last 30 or 40 years must for 95 per cent be ascribed to the introduction of

refined x-ray methods. In nearly all diseases which cannot be diagnosed by radiological examination, little progress has been made. Since x-ray examination does not play a role in the diagnosis of appendicitis even today, many cases of this disease cannot be recognized. It follows that a number of patients with intermittent attacks of appendicitis are considered to suffer from psychosomatic disturbances and are entrusted to the care of psychiatrists. All this notwithstanding, I am convinced that Muriel is well taken care of by Dr. Baty. I also fully understand that Mrs. K. belonged to the few survivors among the unfortunate victims who were so cruelly persecuted for racial bias by the perfidious barbarians of our time.

When, after unbelievable physical and mental suffering, she ultimately reached the shores of the hospitable U. S. A., she undoubtedly needed psychiatric help in order to adjust herself. But these two examples do not help to remove the differences of opinion which prevail between physicians and psychiatrists.

For many decades it is known that when the stock exchange quotations are falling, diabetic patients interested in these fluctuations, fare badly. This is only one of numerous examples where psychiatrists, willing to sit down and talk with patients to correct their psychoneurotic or psychosomatic troubles, can improve many organic diseases. In hospitals where a close liaison exists between psychosomatic medicine on one hand, organic medicine and surgery on the other hand, the influence of psychoneurosis upon disease can be demonstrated again and again.

There is, however, another side to this problem. Unfortunately every disease, ranging from a tumor of the brain to flat feet, starts with fatigue. It is hardly ever possible to diagnose a disease in such an early stage since our diagnostic methods are in general only efficient in late stages of disease. In the initial stage of organic disease where notwithstanding careful examination no organic signs can be found, psychiatric treatment is often recommended, sometimes leading to an unfortunate delay in the diagnosis of the organic disease.

On the other hand the psychiatrists rightfully blame the physicians for prescribing tranquilizers for many years to patients who bitterly needed psychiatric treatment. The realization that occasionally both sides are to be blamed, will be helpful to eliminate the acrimonies which often spoil the pleasant relationship which for good patient's care must exist between psychiatrists and physicians. Nobody can doubt that psychiatrists have an important role to fulfill also in organic medicine. If a patient has an organic disease effective treatment is only possible if the concomitant problems of the soul are also solved.

Dr. Philip Solomon:—I should like to say just a word in answer to Dr. Wangenstein's remarks about treatment in psychiatry being unsatisfactory. I completely agree, and I reluctantly admit that psychiatry has been somewhat

oversold in our modern medical world. I think this is unfortunate, and I think it accounts for a lot of the unsatisfactory relationship that exists between the new specialty of psychiatry and general medicine.

One has to keep in mind that it does not necessarily have to be "either or", either psychiatry or organic medicine, but it might well be both approaches which are necessary in the proper care of a patient. There is something strange about the "either or" alternative in the human mind. It is so much easier to reason that something is "on" or "off", and even the modern giant computers, I understand, work on the base "two". Their numbers are organized on "zero" or "one", "on" or "off", and this mechanical brain has to work that way, but the human brain can work much more effectively, and we can think of "on", or "off", or "both", and I think here particularly, where psychiatry and organic medicine overlap, one should try to keep both in mind.

Dr. Snapper's generous acceptance of the possible value of psychiatry I would thank him for, and I certainly agree that one case doesn't prove anything. Psychiatry is still young. One day we hope to be more precise and helpful, particularly with the recognition of early disturbance in the realm of emotional disorder.

My remarks today represent an attempt at one contribution, namely, the possibility that abdominal pain can be a mask for serious depression. There are more than just isolated instances. If one searches through the statistics of successful suicides, it is rather remarkable how often the presenting complaint to the family doctor had been something like abdominal pain, or itching, or some other symptom which a patient complained of for months and months, and for which the doctor attempted treatment for months and months, overlooking the fact that there was a serious depression just beneath the surface.

So I would caution you only on this one point. You cannot refer every case to a psychiatrist, I agree, Dr. Snapper, and it is not because there is stigma attached to the referral to a psychiatrist. This, fortunately, is diminishing, but there just are not enough psychiatrists, and you therefore, as I said in the paper, must each of you be to some extent your own psychiatrist.

Dr. Wangenstein:—I should like to ask Dr. Solomon a question, if I may.

There probably are as many differences in psychiatric technics as there are differences in surgical procedures. There are operations that take all day, and operations that only take a few minutes. I have a feeling that for certain kinds of disorders, the psychiatrist sometimes goes too far in turning an individual upside down, thereby multiplying the patient's conflicts. Is it not likely that for some of the ordinary disorders, which suggest the need for psychiatric help that the psychiatrist would be well advised to employ simpler and more direct technics which do not turn the individual inside out, so that it becomes necessary to try to reassemble him? It seems to me that in submitting the patient to a

soul searching inquiry the psychiatrist may set the patient back and in fact do him harm. I have the feeling that the psychiatrist needs to give serious thought to devising lesser and more direct approaches for many of the simpler problems for which we would like to use the special talents of the psychiatrist.

Dr. Snapper:—Dr. Solomon, I have been taught that at the autopsy of people with an organic psychosis who continuously complained about “a rat biting their intestines, or a watch ticking in their abdomen”, always organic lesions are found in the abdomen.

Would this experience have some bearing upon the problem you so clearly analyzed for us?

Dr. Solomon:—I quite agree that psychiatrists make mistakes. Dr. Wangenstein, I don't throw at you the mistakes that surgeons make, nor at you, Dr. Snapper, the mistakes that internists make. It seems to me that your remark about conceit is a most profound one, and I think we can all take it to heart. Psychiatry, being a younger field, perhaps makes many more mistakes, and I wish it were not true. I wish we knew much more about the scientific elements that go into psychogenic causation of disease and its proper scientific management.

I suppose it must necessarily be true that as one develops a new field, especially as concerns treatment, what seems to be of value for one individual may be tried for another. I am sure there is a good deal of therapy that takes place in the psychiatrist's office that could be improved upon, and I am sure will be improved upon as we learn more of scientific value in this specialty.

Yes, Dr. Snapper, there are individuals who complain of a gnawing in their intestines and later turn out to have something wrong in their intestines, perhaps not something that caused their mental indisposition but was concomitant with it. These are interesting cases and give us pause and there are, unfortunately, many more cases of individuals who die without organic or at least without discoverable organic cause for these strange symptoms that they complain of for many years. It is these where we feel that depression *per se* may be playing an important role, that we wish to caution you about, because these patients do not require the long taking apart and putting together again that goes with psychoanalysis. These patients do very well with shock treatment and it is a relatively rapid and effective treatment for proper kinds of depression. When we find something that seems to be of practical clinical value, like the recognition of masked depression, we offer it for you to think about, not that it is proof of anything, but it is something to keep in mind if you see a case that falls into this category.

Dr. Wangenstein:—Just one more thing: what about the training of the psychiatrist? Is he a person trained in internal medicine, too? I was recalling, Dr. Solomon, as you spoke, that I have sent quite a few patients to psychiatrists,

but I cannot remember nor recall that a psychiatrist ever sent a patient to me. Possibly psychiatrists refer patients to internists when they need help and let them determine whether the internist should call a surgeon—a situation which inevitably leads to further delays.

It occurs to me that a psychiatrist, if he is as well trained as we would like to think he is in general medicine, that if he finds a situation like a diverticulum of the colon—why not consult directly with a surgeon about it? What happens in my area, probably happens in all areas. If psychiatrists are as well grounded in internal medicine as you would have us believe, why should they not consult directly with surgeons? (Laughter)

Dr. Solomon:—I don't know what psychiatrists you use. I am sure they must be very good ones. Perhaps it is just coincidence that they haven't had occasion to run into acute surgical conditions that were not first brought directly to the surgeon by the patient himself.

My own experience is that I have referred patients to surgeons and also to internists. Psychiatrists do have to have a training in internal medicine before they undertake their long and arduous training in neurology and psychiatry. Organic medicine must be a *sine qua non* for any branch of medicine, and this includes psychiatry.

I wish I had time to tell you of some cases that I have run into where surgeons and I have had to work together. I think here, too, as in the relationship between internal medicine and psychiatry, a working arrangement will become more of a usual thing as psychiatrists demonstrate that they really have something to offer. You must not judge the field of psychiatry by isolated practitioners of it, any more than one case, as Dr. Snapper says, proves anything. One psychiatrist doesn't prove or disprove anything, either, but, whether one likes it or not, the field is marching forward and I believe is due to make a contribution to general medicine.

SURGERY OF DUODENAL ULCER*

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The ideal operation for duodenal ulcer is one which always cures the ulcer, prevents its recurrence, and leaves the patient asymptomatic. So far as I know, there is no operation which entirely fulfills these criteria. This is why surgeons continue to search for the ideal. My associates and I have been investigating this matter in recent years and feel at the present time that the results of hemi-gastrectomy combined with vagotomy more nearly approach the ideal than those of any other procedure we have studied^{1,2}.

At the beginning of this investigation, some eight years ago, we were performing subtotal gastrectomy as the operation of choice whenever feasible in

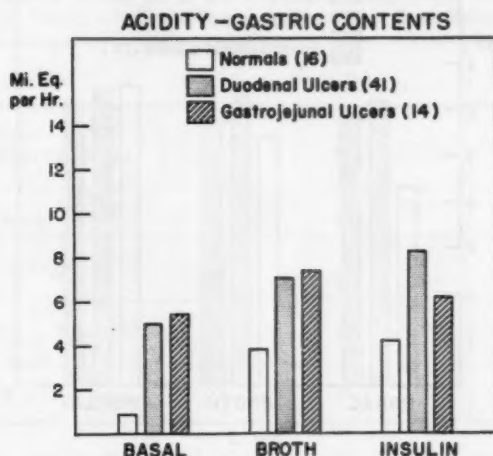


Fig. 1

the treatment of duodenal ulcer. Gastroenterostomy alone had been pretty much discarded because of the high incidence of recurrent peptic ulceration. Vagotomy alone, introduced by Dragstedt³ and his associates in 1943, had been shown by them to be unsatisfactory. Vagotomy combined with gastroenterostomy or pyloroplasty, to eliminate the stasis which followed vagotomy alone, was in the process of being evaluated.

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In discussing the operation of hemigastrectomy combined with vagotomy I should first of all like to tell you why we became interested in this particular procedure. Being old enough to have had an extensive experience with gastroenterostomy alone and with subtotal gastrectomy alone in the treatment of duodenal ulcer, I was interested in trying to find a procedure which might have had the advantages of both of these operations and the disadvantages of neither. The reason why gastroenterostomy alone failed as an operation for the treatment of duodenal ulcer was that it did not afford adequate protection against recurrent peptic ulceration. Gastrojejunal ulcers occurred too frequently, especially in the early years after operation and also continued to develop even 25 years or more later. On the other hand, other serious secondary side-effects of operation such as nutritional problems, the dumping syndrome, distress after

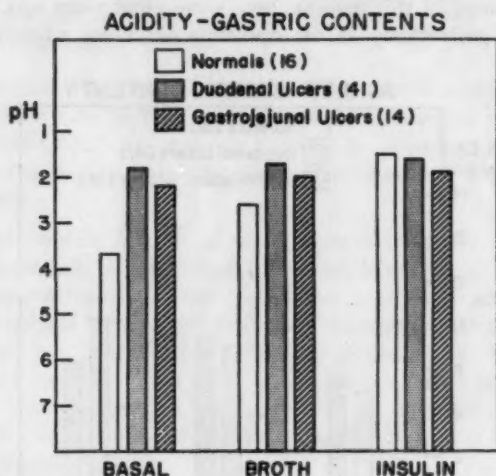


Fig. 2

eating, anemias, inability to eat certain foods, the need for frequent feedings, etc., were almost nonexistent after posterior gastroenterostomy alone. By contrast, subtotal gastrectomy proved to be much more effective in protecting against recurrent peptic ulceration but was followed by a disturbing incidence of the other secondary undesirable side-effects which I have mentioned. The more radical the operation, and the smaller the gastric remnant, the greater the protection against recurrent ulceration, but the higher the incidence of undesirable secondary side-effects.

What we were searching for was a procedure which would give maximal protection against recurrent ulceration, which would be followed by as few undesirable secondary side-effects as possible, and which would carry an ac-

ceptable morbidity and mortality rate. Since protection against recurrent ulceration is dependent upon the physiological response to operation, we developed a method of study designed to evaluate the effect of various procedures upon the acidity of the gastric contents.

Figure 1 shows the average quantity of HCl recovered from the gastric contents of normal individuals, of duodenal ulcer patients and of cases who had developed gastrojejunal ulcers after various operations for duodenal ulcer. The quantity of acid is expressed in mEq/hr., under fasting or basal conditions of study, in response to stimulation by a food substance—peptonized beef broth, and finally in response to vagal stimulation induced by means of insulin hypoglycemia. Under all conditions of study and especially in the fasting or basal

TABLE I

EFFECT OF VARIOUS OPERATIONS FOR DUODENAL ULCER UPON GASTRIC ACIDITY
AS JUDGED BY THE INCIDENCE OF ACHLORHYDRIA UNDER FASTING
CONDITIONS OF STUDY AND FOLLOWING STIMULATION BY BEEF BROTH AND INSULIN

| Operation | No. of cases | Free HCl absent (pH 3.5 or more) |
|--|--------------|-------------------------------------|
| Gastrojejunal ulcers following various operations | 27 | 0% |
| P.G.E. + Vagotomy | 16 | 25% |
| Gastrectomy ½ + Vagotomy | 6 | 50% |
| Hemigastrectomy + Vagotomy | 10 | 80% |
| Gastrectomy ¾ + Vagotomy | 10 | 80% |

state, duodenal and gastrojejunal ulcer patients produce more acid than do normal individuals. Under basal conditions of study—normal people secrete less than one-fourth as much HCl as do duodenal ulcer patients.

In Figure 2, the acidity of the gastric contents of these same individuals is expressed in terms of hydrogen ion concentration. It is of interest that the average pH for normal individuals is more than 3.5 under fasting or basal conditions of study. If the pH is 3.5 or more, free HCl is absent. In ulcer patients, the average pH is about 2 under all conditions of study. Peptic activity is maximal at a pH of about 2. All of our patients who have developed gastrojejunal ulcer have pH levels below 3.5 under one or all of these conditions of study.

Having developed what we regarded as a satisfactory method of study, we reviewed a larger group of patients with gastrojejunal ulcers following various

operations and found, Table I, that none of 27 such patients were achlorhydric if the gastric contents were tested under basal conditions of study, in response to the ingestion of food (beef broth) and following stimulation of the vagus nerves by insulin hypoglycemia. In other words, the old saying—no free acid no peptic ulcer—appears to be a valid statement. We have yet to see a gastroduodenal ulcer in the presence of achlorhydria under these three conditions of study. Since, in my opinion, the primary purpose of an operation for duodenal ulcer is to cure the ulcer and prevent a recurrence, we established as an essential criterion of success, from a physiological viewpoint, the production of achlorhydria under these three conditions of study.

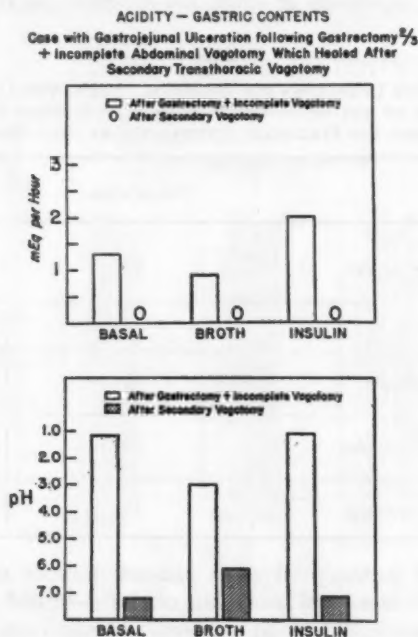


Fig. 3—Reproduced by permission of the *Rhode Island Medical Journal*.

We then operated upon small groups of patients performing a vagotomy in each and adding certain additional procedures hoping to find some combined maneuver which would satisfy both our physiological and clinical criteria for success. As indicated by Table I, following posterior gastroenterostomy combined with vagotomy only 25 per cent of 16 patients were achlorhydric. We then operated upon six patients removing the distal one-third of the stomach in order to eliminate the antral factor and resected the vagus nerves. Half of these patients were achlorhydric. Next we operated upon ten patients and re-

moved the distal one-half of the stomach and sectioned the vagus nerves. Eighty per cent were achlorhydric in the early postoperative period. We then performed subtotal gastrectomy in ten patients and resected the vagus nerves and found that 80 per cent were achlorhydric in the early postoperative period.

This suggested to us that removal of less than one-half of the stomach, when combined with vagotomy, would not give a high enough incidence of achlorhydria to duplicate the protection against recurrent ulceration which subtotal gastrectomy alone affords, since in our experience two-thirds of patients are achlorhydric after subtotal gastrectomy alone. Also, it did not appear that removing more than one-half of the stomach, when combined with vagotomy, increased the incidence of achlorhydria. Therefore, we decided to develop a series of carefully studied and followed patients having hemigastrectomies combined with resection of the vagus nerves and compare the physiological and

TABLE II
DUODENAL ULCER:
EFFECT OF VARIOUS OPERATIONS UPON THE ACIDITY OF THE GASTRIC CONTENTS

| Operation | Author | No. of Cases | Free HCl Absent |
|--|-----------------|--------------|-----------------|
| Hemigastrectomy (B_2) + Vagotomy | Smithwick et al | 55 | 84% |
| S.T.G. (B_2) | Smithwick et al | 70 | 66% |
| Subtotal Gastrectomy (B_2) + Vagotomy | Colp, 1952 | 50 | 84% |
| S.T.G. (B_2) | Colp, 1952 | 40 | 68% |

clinical results with those of a parallel series of subtotal gastrectomies. We hoped that by leaving behind a larger gastric remnant the incidence of undesirable secondary sequella following hemigastrectomy and vagotomy would be lower than after subtotal gastrectomy alone and would be more comparable to the results following gastroenterostomy alone in this respect. We also hoped that this combined procedure would give greater protection against recurrent ulceration than did subtotal gastrectomy alone.

We were curious as to why 20 per cent of patients were not achlorhydric following hemigastrectomy or subtotal gastrectomy combined with vagotomy. A study of the data revealed that in every instance, there was evidence that the vagotomy was incomplete. The findings illustrated by Figure 3 are typical of these patients. The upper portion of Figure 3 shows that after subtotal gastrectomy followed by incomplete vagotomy for gastrojejunal ulcer, stimulation of the vagus nerves by means of insulin hypoglycemia resulted in a significant

increase in the mEq. output of acid over that noted under fasting conditions of study. In other words, the vagotomy was incomplete. The ulcer did not heal. Following secondary vagotomy, this patient became achlorhydric with pH's in the 6-7 range as indicated by the lower portion of the figure. The ulcer healed promptly. Presumably, the other patients would also become achlorhydric after secondary vagotomy.

At this point we were distinctly worried about what would happen to patients with incomplete vagotomy with the passage of time, and also whether evidence of regeneration of the vagus nerves would appear as time went on in the achlorhydric group. For these two reasons we increased the size of the series slowly in the early years of this study until we could obtain data upon these two points.

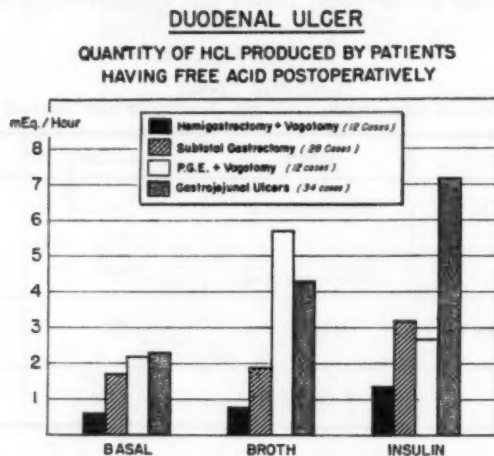


Fig. 4

With the passage of time and with further experience, reassuring evidence on these points was obtained. As shown by Table II, the incidence of achlorhydria in 55 cases treated by hemigastrectomy and vagotomy increased somewhat to 84 per cent and compared favorably with an incidence of 66 per cent in 70 cases in our parallel subtotal gastrectomy series. Also, Colp et al⁵ published almost identical statistics indicating that 84 per cent of 50 subtotal gastrectomies combined with vagotomy were achlorhydric thus tending to confirm our original impression that taking out more than one-half of the stomach when combined with vagotomy would not increase the incidence of achlorhydria appreciably. They also found that in 40 cases having subtotal gastrectomy alone, the incidence of achlorhydria was 68 per cent, a figure which checked closely with ours.

At this point we became interested in the quantity of acid produced by patients who were not achlorhydric after various operations. We found that patients having incomplete vagotomies combined with hemigastrectomies compared most favorably with other cases having different operations. As indicated by Figure 4, on the average the quantity of hydrochloric acid expressed in mEq/hr. is much smaller after 50 per cent gastrectomy and incomplete vagotomy than after subtotal gastrectomy, or posterior gastroenterostomy and vagotomy, or especially in patients who have developed gastrojejunal ulcers after various operations.

What may be said about acid production also holds for pepsin output. Hence, even in cases who are not achlorhydric after hemigastrectomy and vagotomy, the output of hydrochloric acid is very low and presumably the protection against recurrent ulceration is greater than following posterior gastroenterostomy and incomplete vagotomy, or subtotal gastrectomy alone.

TABLE III
DUODENAL ULCER: POSTOPERATIVE SECRETORY STUDIES

| Time Postoperative | Subtotal Gastrectomy | | Hemigastrectomy + Vagotomy | |
|--------------------|-------------------------|--------------------|-------------------------------|--------------------|
| | No. of Cases | % with free HCl | No. of Cases | % with free HCl |
| 8 days—23 months | 76 | 36 | 87 | 14 |
| 24—70 months | 106 | 39 | 28 | 4 |
| Totals | 182 | 37 | 115 | 11 |

I mentioned the output of pepsin. I am not going to discuss it in detail at this time but would like to say that on the basis of a rise in pepsin output following insulin stimulation over the fasting levels, one must suspect that many patients who are achlorhydric do not have complete vagotomies. If a patient is achlorhydric under all conditions of study one cannot say for sure that the vagotomy is complete. All one can say is that the patient is achlorhydric. That is the important point and it is what we are aiming for by whatever mechanism it is brought about. If, however, such patients show a rise in pepsin output on insulin stimulation, one may doubt the completeness of the vagotomy. Figure 5 gives the findings in a case that developed a gastrojejunal ulcer, after a subtotal gastrectomy. As would be expected the pH values shown on the left side of the figure were low both when fasting and after insulin stimulation. After vagotomy the pH values (black rectangles) were well above 3.5 (actually in the 4-6 range) both when fasting and after insulin stimulation. Since free HCl was absent one cannot say with certainty that the vagotomy was complete, although

by accepted criteria—it was. The change in pH from about 6 fasting to nearly 4 on insulin stimulation suggests that it was not complete. The rise in pepsin concentration as indicated by the black rectangles in the central portion of the figure after vagotomy on insulin stimulation indicates that there is still some residual vagal activity. This is of no clinical importance since the peptic activity after vagotomy is negligible (3-4 units/hour) as shown on the right side of the figure because pepsin concentration is calculated at a pH of about 2, while peptic activity is calculated at the actual pH of the gastric contents.

As time goes on we feel, more and more, that many patients do not have complete vagotomies and that achlorhydria is achieved by a combination of effects among which the regurgitation of bile may be extremely important, as was the case in the patient illustrated by Figure 6. In this case, the duodenal

PRE & POST VAGOTOMY PEPSIN STUDIES IN A PATIENT
WHO HAD DEVELOPED A GASTROJEJUNAL ULCER
AFTER SUBTOTAL GASTRECTOMY.
ACCORDING TO STANDARD CRITERIA THE VAGOTOMY IS COMPLETE

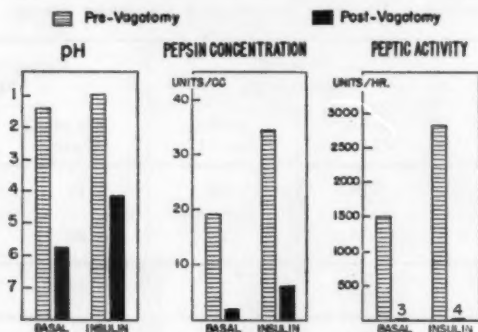


Fig. 5

stump was very difficult to manage and the closure was unsatisfactory. Consequently, a catheter was inserted in the duodenum with its tip close to the ampulla of Vater and placed on continuous suction, postoperatively. The secretory findings before operation showed the usual low pH values under all conditions of study. These were repeated about ten days after operation with the patient on continuous duodenal suction, largely eliminating the factor of regurgitation from the picture. The pH values were still very low and only slightly higher than before operation in spite of the fact that the distal one-half of the stomach had been removed and the vagus nerves resected. After the catheter had been removed and regurgitation was taking place, the patient was achlorhydric under all conditions of study with pH values of approximately 7. This emphasizes the importance of regurgitation and the fact that achlorhydria is the result of the combined effect of removing: 1. the antrum, 2. a small segment

of the body of the stomach, plus 3. resection of the vagus nerves, completely or incompletely, plus 4. regurgitation of bile into the gastric remnant.

Our latest statistics are given in Table III and suggest the possibility that a fifth factor is involved in the production of achlorhydria. At the bottom of the table are given the total number of cases operated upon in a six-year period in these two parallel series upon whom secretory studies have been performed, about three hundred in all. There are 115 hemigastrectomies combined with vagotomy and 182 subtotal gastrectomies. The percentage of cases having free hydrochloric acid less than two years after operation is compared with that of cases studied two years or more after operation. Fourteen per cent of the hemigastrectomies with vagotomy have free hydrochloric acid in the early years and 4 per cent in the later years. The longer we follow these patients the higher the incidence of achlorhydria is becoming. This holds for the cases as a whole

TABLE IV
DUODENAL ULCER: FOLLOW-UP DATA

| Operation | No. of cases | Operative mortality | Clinical results (1-6 years) | | | | Gastrojejunal ulcer | |
|----------------------------|--------------|---------------------|------------------------------|------|------|------|---------------------|-----------|
| | | | Excellent | Good | Fair | Poor | Proven | Suspected |
| Subtotal Gastrectomy | 190 | 2.6% | 23% | 41% | 24% | 12% | 3 | 15 |
| Hemigastrectomy + Vagotomy | 135 | 2.2% | 41% | 46% | 9% | 4% | 0 | 0 |

and also for individual patients (i.e., every case so far which has had free acid in the first two-year period after operation and which has been restudied two or more years after operation has become achlorhydric). The same is not the case following subtotal gastrectomy, 36 per cent of cases studied 1-2 years postoperatively had free hydrochloric acid and 39 per cent of those studied 2-6 years postoperatively had free hydrochloric acid. This suggests that as a consequence of being stimulated less actively, by chemical and neurogenic mechanisms, the parietal cells secrete less actively with the passage of time following hemigastrectomy and vagotomy. Since the vagus nerves are still intact to the gastric remnant following subtotal gastrectomy this phenomenon is not observed. This suggests that there may be a fifth mechanism involved in the production of achlorhydria following hemigastrectomy and vagotomy (i.e., a gradual decrease in the secretory activity of the parietal cells with the passage of time).

I have emphasized the physiological aspect of this problem because I consider it to be of great importance. The clinical results are also of equal impor-

tance. As I stated in the beginning, I feel the objectives of an operation for duodenal ulcer should be:

1. To cure the ulcer and prevent recurrence
2. To produce as few undesirable side-effects as possible in the process of so doing, and,
3. To have an acceptable mortality and morbidity rate.

Table IV deals with objectives 2 and 3. The operative mortality was comparable in both series being higher than I would like to see it. This will vary with patient material. There were many old and poor risk patients in our series but the majority of the deaths were due to complications related to the management of the duodenal stump. If these could be eliminated the mortality

ACIDITY - GASTRIC CONTENTS
Effect of Bile and Pancreatic Juice on pH of Gastric Contents
following Hemigastrectomy + Vagotomy

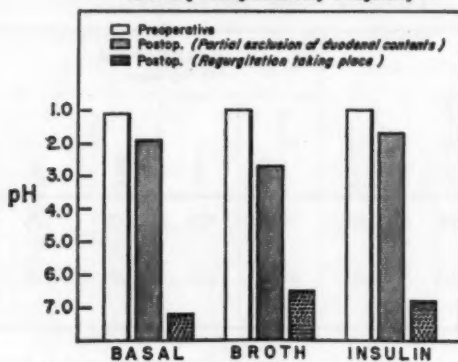


Fig. 6

rate would be under 1 per cent in both series. The clinical results of hemigastrectomy and vagotomy compare very favorably with those following subtotal gastrectomy. This can best be demonstrated by dividing the results into four categories—excellent, good, fair (all acceptable) and poor. There are more excellent results and fewer fair or poor results in the hemigastrectomy and vagotomy group. In addition there are as yet no known or suspected gastrojejunal ulcers following hemigastrectomy and vagotomy, while at the same time there were 3 known and 15 suspected stomal ulcers in the subtotal gastrectomy series.

SUMMARY

When judged on both a physiological and clinical basis, hemigastrectomy and vagotomy is in our hands a very satisfactory operation for the treatment

of duodenal ulcer. It is our procedure of choice today. The evidence at hand suggests to me at any rate that it will stand the important test of time. While a longer period of observation is needed to establish this as a fact, the high incidence of achlorhydria, which appears to be increasing with the passage of time, suggests to me that these patients are rarely going to be troubled by recurrent peptic ulceration in the late postoperative period. Poor clinical results are rare, while excellent and good clinical results predominate. The incidence of severe or distressing postoperative symptoms is lower than following subtotal gastrectomy. The results of hemigastrectomy combined with vagotomy more closely approximate the ideal than those of any other operation for duodenal ulcer we have studied.

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DISCUSSION

Dr. O. H. Wangenstein:—Segmental gastric resection has been employed in this clinic since 1949. Knowing the great prejudice against leaving the antrum when resecting the stomach for ulcer, in taking up with this operation, I felt impelled to do a fairly extensive excision of the acid-secreting area. I posited my defense of this undertaking on the thesis that, it was *antral exclusion* that potentiated ulcer recurrence not *retaining* the antrum.

Between 1949 and 1952, 94 such resections were done for duodenal ulcer. In that group of operations done 5 to 9 years ago, there has not been a single instance of recurrent ulcer.

Because the observed incidence of the dumping syndrome in this group of patients with an extensive segmental resection was about the same as in a group of patients undergoing the Billroth II operation (75 per cent resection) and larger than we had hoped it would be, I continued to cast about for other procedures with which to attack the ulcer diathesis. The next venture concerned tubular resection. This operation, however, has not proved to be as good an operation as segmental resection. Tests employed to adjudicate the strength and weakness of various operations indicated that, recurrence would probably follow the procedure. And in fact, since the operation was discontinued, in 1955,

a few ulcer recurrences following tubular gastric resection have been observed (3 per cent).

Over the past three years, we have been re-exploring the use of segmental resection, especially with a view to finding how large the segmental resection needs to be to combat the ulcer diathesis effectively. It would appear that, an excision of approximately 50 per cent of the entire area of the stomach is necessary to protect against recurrent ulcer. Inasmuch as the antrum which constitutes approximately in the area of 20 per cent of the stomach is left in this procedure, the entire excision is done in the acid-peptic secreting area. To effect a 50 per cent resection of the entire stomach, it is obvious that about a 60 per cent excision of the acid-secreting area needs to be done to reduce the stomach to 50 per cent of its initial size.

Segmental gastric resection has proved to be a very adequate and satisfactory operation, viewed from any standpoint. The mortality of the procedure is low, less than 2 per cent. It is the most conservative of all resections done for acid-peptic ulcer. Whereas the incidence of dumping was about the same in the extensive segmental resection as it was in the Billroth II operation, experience has shown that for the 50 per cent gastric segmental resection the incidence of dumping is very low. Segmental resection protects against recurrent ulcer and is accompanied by a very low incidence of undesirable side-effects.

Failure of the operation in the hands of German surgeons 50 years ago, who employed segmental resection only in the management of gastric ulcer, was owing primarily to omission of pyloroplasty. Transverse division of the stomach necessitates a complementary pyloroplasty, inasmuch as the pylorus is vagotomized in the procedure, unless extreme pains are taken to preserve the antral vagal twigs coming along the lesser curvature of the stomach.

One of the great surprises has been the defection of the Billroth I procedure in protecting against recurrent ulcer. Moreover, it would appear from data already reported that, the incidence of gastrojejunal ulcer also will be greater following the Billroth I procedure when accompanied by vagotomy, contrasted with the Billroth II procedure accompanied by vagotomy. The reasons for the greater likelihood of stomal ulcer following the Billroth I operation are not apparent. It is my feeling that the answer probably will be found in the circumstance that, the first few centimeters of the duodenum are not well accommodated to receive the acid-peptic secretion from the fundic glands of the stomach. In other words, the neostoma following the Billroth I operation probably has less opportunity to protect itself than does the neostoma after the Billroth II procedure in which all the drainage materials of the afferent duodenojejunal loop pass by the stoma. After the Billroth I operation, on the contrary, the mucosa of the first few centimeters of duodenum is bathed at long intervals only by the acid-peptic juice which drains away more or less continuously from the residual fundic pouch.

Some of you will recall that Lillehei and I (*Gastroenterology* 15:487-497, 1950) found that hemigastrectomy on the Billroth II plan of operation robbed vagotomy of the protection which it afforded against the histamine-in-beeswax provoked ulcer. Recollection of this circumstance has made me a bit conservative over acceptance of a 50 per cent distal gastrectomy and vagotomy on the Billroth II plan of operation for duodenal ulcer. Dr. Smithwick, however, comes forward today with data which suggests very definitely that for man at least distal gastrectomy (Billroth II) with vagotomy seems to thwart the peptic ulcer diathesis. This is very reassuring evidence.

It would appear therefore that, the two operations which seem to stand up best under scrutiny of the criterion of thwarting recurrent ulcer are: segmental resection (50 per cent) and the Billroth II operation (50 per cent) accompanied by vagotomy. A 50 per cent segmental resection with a complementary pyloroplasty is probably the most conservative of all resection techniques. Moreover, for the difficult duodenal ulcer crater segmental resection offers a distinct technical advantage on a Billroth II procedure. Whereas the extensive segmental resection performed between 1949 and 1952 was accompanied by a fair number of instances of dumping, this occurrence in the 50 per cent segmental resection has not been frequent.

Those of you who find the dumping syndrome a problem after resection operations may be interested in the employment of hypnotic suggestion, which technic we have found very useful in combatting some of the undesirable side-effects of extensive resections. We have been giving this approach to the management of dumping a clinical trial. A preliminary report will be published in the *Journal of the American Medical Association* presently [165:1957, (14 Dec.), 1957]. We have found hypnotic suggestion very useful in the treatment of this group of symptoms in a small group of patients. In fact, many patients who were disabled for one reason or another—inability to work, weakness, anorexia, inability to drink milk and a variety of complaints have been rehabilitated by hypnotic suggestion. In other words, the success of this method has been so good that we no longer feel that the occurrence of dumping constitutes any serious handicap to an otherwise promising operation. Such patients can be treated satisfactorily by hypnotic suggestion. It is interesting that, suggestions made under the influence of hypnosis are accepted, whereas similar suggestions made to the same patients in the waking state are rejected. The transition from rejection to acceptance is an important phenomenon, as we all know, in many of life's problems.

Dr. I. Snapper:—Several decades ago I heard my teachers rave about their wonderful results with gastroenterostomy. Later Schoemaker (in Holland) praised the Billroth I operation, Dr. Wangenstein the modernized sleeve operation, and now Smithwick the Billroth II operation.

All these men spoke the truth, because, I am sure that a competent surgeon can obtain an excellent result with any technic he is accustomed to. I have sincerely admired Dr. Smithwick's presentation and as for today—I am under the impression that I never heard a more convincing recommendation of the Billroth II method.

Dr. Reginald H. Smithwick:—In the early part of this study, all of the work that we have done in man we also did in dogs. In patients we studied when fasting, we found that there was no difference in the statistical analyses between the data that we obtained by studying patients who fasted overnight and were tested the first thing in the morning and what we obtained by the so-called 12-hour night secretion that Dragstedt was using at that time.

Since aspirating animals and humans for twelve hours is a very unpleasant maneuver to get a fasting secretion, we finally got it down to a one-hour aspirating period for basal secretion, the first thing in the morning, the tube having been placed carefully fluoroscopically. Then we put 80 c.c. of peptonized beef broth in the stomach and let it stay there for 20 minutes and then aspirated it. Following that, we have another one-hour run, which is what we call a response to a food stimulus. The broth is not ingested. It is put in through the tube and left in the stomach. The tube is at the level of the mid lesser curvature fluoroscopically. The broth is left there 20 minutes and aspirated, and then we run a one-hour test after that. Then we do the insulin test, injecting a certain amount of insulin, and run a two-hour test, splitting that into two one-hour observations and taking whatever shows the greater response which is usually the second hour, as the response to insulin.

We have used histamine because so much of Dr. Wangenstein's work has been based on histamine as a test of achlorhydria, which is a very potent stimulus. We did all this in dogs and, as I recall it, in essence the dogs behaved just the way the humans did all the way through and responded to the different stimuli, just as man did. The response was much less to broth than to histamine, and the problem in our mind was just how severe a test of achlorhydria you need. If you are going to settle for histamine achlorhydria, especially the triple test, you have to do a much more radical operation to abolish it than to abolish the secretory response to food or a food stimulant.

Now, it is very easy to produce achlorhydria, or relatively easy to produce achlorhydria in dogs, to the broth stimulus in comparison to histamine. What we are interested in is the patient's response to eating, and it seems to me that food or peptonized beef broth is perhaps a more physiological stimulus than histamine, so we have eliminated histamine and we have settled for these three: fasting, food, and the vagal stimuli. If we can produce achlorhydria to all three, we don't have recurrent ulcers.

Incomplete vagotomy, I tried to imply, is probably quite common. Four per cent of our patients, studied two years or more after operation, show incom-

plete vagotomy, and some 14 per cent in the first two years show it as judged by the acid response to insulin. If, however, you go by the pepsin studies, a very much higher per cent show evidence of vagal activity, so I think a great many of these people are not completely vagotomized.

Dr. Wangenstein:—What per cent show a pepsin response to insulin?

Dr. Smithwick:—I don't know exactly, but I think about 25 or 30 per cent show a pepsin response. We are in the process of checking that figure now. If you go by achlorhydria alone, you cannot determine the incidence of incomplete vagotomy since a vagal response may be camouflaged by achlorhydria, whereas a pepsin response will not be.

As to the Billroth I, I agree with everything Dr. Wangenstein has said about it. Perhaps as a technic for subtotal gastrectomy alone for duodenal ulcer it has some advantages over an equally radical Billroth II. Perhaps there are fewer weight problems, but other than that I can't see that it has any advantage, and so far as hemigastrectomy plus vagotomy is concerned, we have used Billroth II technic in all duodenal ulcer cases.

Every now and then, when we are operating on a benign gastric ulcer where the duodenum is easy to handle, we will do a Billroth I. I don't like it very well. I think they have more stasis even if you don't cut the vagus nerves, but, since you don't have to do such a radical operation in gastric ulcer, that seems to me to be the ideal place to use the Billroth I, if you are ever going to use it.

So far as these patients go, the Billroth II has been so satisfactory that I am not interested in the Billroth I operation. In a recent publication Dr. Edwards indicated that some 40 or 50 patients had been added to their series using a Billroth I technic, plus vagotomy. They had so much trouble with stasis that they had to reoperate on 10 per cent of them, converting them to Billroth II. That also makes me feel that I am not interested in changing our technic because we have had so little difficulty with either stasis or dumping.

I think the principal hazards of any operations for duodenal ulcer are the complications resulting from the management of the duodenal stump. It is most important to have alternative maneuvers. I feel as you do, that you have got to get somewhere close to achlorhydria or you are going to have a lot of trouble with recurrent ulcers. I am more enthusiastic about segmental resection than gastroenterostomy and vagotomy as an alternative, since it results in a much higher incidence of achlorhydria.

There is one question here, which I think is a very good one, which came from the floor: "What is the incidence of carcinoma of the stomach in patients having hemigastrectomy and vagotomy or subtotal gastrectomy, that are achlorhydric?" I don't know whether you have any figures in mind on that, but there

is a recent article in a Scandinavian journal—at least I saw it recently, which compared the incidence of carcinoma in the gastric remnants of patients who had subtotal gastrectomy for duodenal ulcer, with those who had subtotal gastrectomy for gastric ulcer. They found a statistically significantly higher incidence of subsequent cancer in the patients who were operated on for gastric ulcer. We know that 100 per cent of them are achlorhydric, and, say two-thirds of the duodenal ulcer patients will be achlorhydric with the same operation, so the implication is that achlorhydria may in 15 or 20 years have some untoward effect that we don't know about.

DIAGNOSIS OF GASTRIC CARCINOMA
CLINICALLY WARRANTED, LABORATORILY UNCONFIRMED

REPORT OF CASE

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Sir Francis Bacon has so aptly said that "Writing maketh an exact man". This has special significance when a physician is describing a case with which he himself has been afflicted. The writer sought to determine whether this case report is instructive because of a high index of suspicion of malignancy, or because a pathologic lesion has been quietly present in a relatively silent gastric area in a host asensitive to pain, or because of a known history of a previous presentation of a triad—anorexia, loss of weight, and progressive asthenia—with nonretention of fluids.

Dr. Chester Cassel, Jackson Memorial Hospital, Miami, Fla., wrote the following:

"I am herewith sending a summary of the studies performed during your stay at the Jackson Memorial Hospital, Miami, from 13 to 20 February 1957. As you know, there has been a loss of appetite, general feeling of malaise, vague upper abdominal discomfort and the loss of a few pounds of weight. The general physical examination, including examination of the rectum, disclosed no pertinent abnormality.

"Accessory clinical data: Hgb. 13.6 gm., RBC 4.5, WBC 5,550, poly 64, stab 13, lymph 23, platelets appeared normal, corrected sed. rate 21 mm/hr., hematocrit 39 vol. per cent. Urine analysis: specific gravity 1.012, pH 6.0, protein 0, sugar 0, bilirubin 0, RBC 0, WBC occasional. Stool examination for ova, parasites and occult blood, negative. Fasting blood sugar 85 mg. per cent. Alkaline phosphatase 3.8 Bodansky units, serum amylase 57 units, phosphorus 2.8, acid phosphatase 1.6. Gastric analysis: No free HCl after histamine stimulation, maximum total acidity 18.

"Oral *cholecystography* disclosed a normal concentration of dye and no evidence of calculi. *Barium enema* study showed no obstruction lesion. A few diverticula were seen in the sigmoid region. *Upper gastrointestinal series* showed no lesion of the esophagus, stomach or duodenum. The one-hour film showed a normal progress of barium through the small bowel. *Chest film* showed no lesion of the lung fields, heart or mediastinum. *X-ray of the lumbar spine and pelvis* showed no bony lesion. There is a disk degeneration in the fourth lumbar interspace and hypertrophic changes in the lower lumbar vertebrae. Calcification is seen in the abdominal aorta with no evidence of aneurism. ECG was within normal limits.

"Because of pain in the region of the right hip, an orthopedic consultation was obtained by Dr. Harry Beller. He thought that the arthritic condition of the lumbar spine was responsible for the pain.

"Final diagnoses were osteoarthritis of the spine and undiagnosed condition of the stomach manifested by achlorhydria and pyloric spasm."

To the above may be added a similar triad episode that occurred in 1942. Nonretention of food and asthenia dominated the clinical picture. A tentative diagnosis of a malignant gastric lesion was roentgenologically negative except for pylorospasm. All other aids in diagnosis were negative. The gastric chemistry yielded high HCl values. Then as now, on the assumption that symptoms of coronary diseases might masquerade with abdominal symptoms, ECG revealed no deviation from the normal. Gastrosocopy, then advised, was declined by the patient—an attitude unbecoming a physician.

COMMENT

A behavior pattern of a case, even though different from a textbook description of gastric carcinoma, nonetheless warrants thought toward malignancy. Concern by the examiner when confronted with a complaining abdomen is warranted at all ages, especially in a patient tinged by life's sunset.

A chance phrase used by a colleague of mine stands out as a nugget of succinct description. "You are a good candidate for malignancy", he wrote me, "and as you get older the chances will be increasing, so, vigilance is the word". It may be said that suspicion of malignancy is mandatory whenever symptoms are focused on the abdomen, an area that must be regarded as a broadcasting station for intra- and extraabdominal disorders. As concomitancy of disease entities is not uncommon in the older group of patients, a thorough search in all directions is indispensable.

Lay people have lately become cancer minded, and to them, abdominal pain spells cancer. To the physician, a murmuring abdomen however sub-clinical, must certainly be a cancer warning until proved otherwise.

PANCREAS

This organ was rightly indicted. While the onset of the case under discussion had a sudden character, it definitely lacked the violence accredited to acute pancreatitis. "Of all the pains the human body can suffer", writes Moynihan, "this is by far the worst". Thus an absence of pain intensity eliminates the pancreas clinically. The writer recalls a case of an acute abdomen admitted as an emergency. The intern in charge bitterly resented the behavior of the patient who raised his hands to resist abdominal palpation. The patient's conduct was significantly descriptive. It delineated a diagnosis of acute pancreatitis. Had it been evaluated properly and followed-up by a blood serum amylase on admis-

sion, it would have served as a potent factor in diagnostic accuracy. It deserves to be emphasized that at the height of an attack the serum amylase may rise considerably, and as the attack subsides the amylase falls precipitously—a fall to less than 100 occurring often within a period of 24 to 48 hours. Naturally, when the test is delayed, the serum amylase might prove uninforming. In the case under discussion, the serum amylase was clinically of no significance.

The case has been assessed as an emergency on the basis of the dominating triad aforementioned. Marked dehydration called for intravenous therapy. The suddenness in onset was the only component that had injected equivocation in a deferred diagnosis of malignancy. The onset of symptoms might have been preceded by a condition that was stealthy inwardly, though outwardly calm, before reaching acuity. "It is the clogged volcanoes that are dangerous, not the open ones, however they smoke." The findings of the physical examination were not remarkable except for conspicuous dehydration, simulating in all data the attack of 1942. Disregarding age, the long asymptomatic interval of 15 years created in the mind of the writer a strong deterrent to an exploratory diagnosis.

HISTORIES IN GASTRIC CARCINOMA

The two familiar types of history are: 1. individuals previously in good health, and 2. individuals with previous gastric disturbances. The latter group includes those attended with asymptomatic intervals of variable duration, and those characterized with continuity. In type 1 the onset of symptoms may occur suddenly, or follow a brief period of indigestion with an acute flaring-up of symptoms. In the second type, where symptom-free intervals become shorter and continuity replaces intermittency, the history denotes awareness of malignancy. The triad complex is common to all carcinomas, but each location determines the extent and accounts for a varied symptomatology.

It is not within the province of this paper to discuss benign gastric ulcers, with loss of periodicity, reduced gastric capacity and symptomatology of a defined change in character. The fact, however, may here be noted that 71 per cent of MacCarty's⁴ resected specimens of gastric carcinoma were associated with ulcer, and that 68 per cent of his resected ulcers were attended with carcinoma. The question whether "ulcers become malignant as one of their sequela" is answered by MacCarty in the affirmative.

GENERALIZED ABDOMINAL TENDERNESS WITHOUT RIGIDITY

Involuntary rigidity was conspicuously absent in the writer's case. This finding struck a comfortable note. A careful palpating hand has the quality of a tensionmeter, but the interpretation must be adjusted to the individual's pain threshold and its perception. Thus the negative findings in the epigastrium and nonelicitation of pain sufficed to eliminate involvement of the pancreas, as already mentioned.

Patients who have been aware of their illness for less than a month were recorded. According to Gray and Balfour², it is commonly held that three months constitutes a history of short duration. Since cervical osteoarthritis of one year's duration with residua has abutted on symptoms of the digestive apparatus, a psychosomatic component could be considered in operation, expressing itself in a play of symptoms as being engendered in spastic phenomena in the pyloric segment of the stomach. In this vein of thought, the concept of an obstructive gastric lesion was detracted and held off the scalpel in search for pyloric stenosis. An insidious onset of gastric cancer detached from the history of cervical rediculitis was not elicited on self introspection, and none on interrogation by the examining physician. A *modus operandi* alike on two occasions (first episode in 1942) proffered a sense of alleviation to a patient whose index of suspicion of malignancy had been heightened.

ACUITY OF ONSET

Acuity, not preceded with warning symptoms, needs definition. The case under discussion may be designated as acute, because the all-embracing clinical picture of marked weight loss, dehydration, etc., was out of proportion to the time of onset. A complacent individual might nurture, with little heed, any minor symptoms of gastric carcinoma. If voluntary rigidity is found in this type of patient, it would be significant, for the patient awaits symptoms he could not ignore. Onset, then, is only relatively acute. As Pottenger pointedly writes, "What is a painful stimulus to one person may not be to another". Libman's styloid-mastoid pressure test serves adequately to detect the hypersensitive individual who is alert to symptoms, however minor, and who comes to examination early in the development of the disease, in contrast to the patient asensitive to pain, who not infrequently presents himself with the complications of a lesion fully developed.

According to Libman³, "Algasimeters do not appear to be of service in practical clinical tests". The following illustrative case involves a male in the mid fifties, a butcher, who only at the very last reluctantly submitted to an examination. To Libman's test-styloid-pressure taken unawares, he definitely was asensitive to pain. It was the observation by his wife that he "didn't leave the platter clean", which intrigued her and invoked the consultation. An x-ray of the gastroenteric tract yielded evidence of a lesion in the silent area of the stomach. Nonresectability and wide metastasis were found on exploration. The salient points in this case were a silent, complacent individual, and a lesion in the stomach where neither ingress or egress of food was stymied at either extreme.

ANALYSIS OF PAIN AND ALLIED SYMPTOMS OF GASTRIC CARCINOMA

Hobney⁴ asserts "Pain, which is nature's semaphore, is an exceedingly important subjective symptom". When pain is translated in terms of objective

findings, the clinical picture assumes tangible dimensions and prompts a tangible assertion as regards etiology.

A history of dyspepsia of about one year's duration, however ill defined, is the expected elicitation in malignancy. The fatigue syndrome that has dominated the clinical picture in the case of the writer, might have well fitted in with the history of a cervical reticulitis of one year's duration. In the case of a lay patient, however, the physician's mind should swing in any direction to which the symptomatology might point. Robbins et al² sought to determine to what extent physicians practiced what they preached, when faced with the possibility of having cancer. Their findings disclosed that "physician patients were 39.8 per cent responsible for delay in diagnosis and treatment of their own cancers, as compared with 39.5 per cent culpability in the case of the laymen". In other words, they were no better than the general population—a comparison—amusingly uncomplimentary to the physician-patient.

Despite the writer's disinclination to be counted among those culpable of delay, a diagnostic laparotomy was averted on clinical judgment.

CONCOMITANCY OF SEVERE PAIN IN RIGHT ILEUM WITH SYMPTOMS OF SUSPECTED GASTRIC CARCINOMA

The severe pain in a region distant from the stomach that had called for hypodermic therapy, indicated the probability of bone metastasis, or a consideration of dual entities, simultaneous in onset. Skeletal metastasis loomed high in the clinical approach because of pain and general abdominal tenderness on admission to the hospital. As, however, roentgen analysis disclosed degenerative lumbar vertebrae with pressure on nerves, and negative evidence of a bone lesion, the divergence became apparent. Suspicion is a precious instrument.

DECEPTIVE ASPECTS IN CLINICAL MEDICINE

Since the backbone of clinical investigation is history, the physician must guard against undue weight given to a patient's account of his own sickness. Deception plays a palpable role in diagnostic omissions or commissions emanating from anamnesis. Besides, siphoning information from some patients is as hard as unweaving a tangled tapestry.

Care must be taken in the case of patients who presented themselves for a "health check-up". Gratified with the negative findings of what at best is a partial examination, they deem further investigation unwarranted. A case in point is that of a highly intelligent patient, 80 years old, seemingly in good health, who related vague symptoms referable to the digestive tract. He saw no reason for the gastric analysis requested by the clinician, because of the clean bill of health he had obtained from a recent chest x-ray administered "without charge". Sadly enough, an exploratory laparotomy performed shortly after, revealed an inoperable gastric carcinoma.

We can but reiterate the old refrain, that investigations must be thorough as well as timely.

INDICATIONS FOR EXPLORATION

Candidly I may say that the case on admission called for aggressive therapy-exploratory, even though the clinical picture was not overcompelling, and adequate laboratory work-up benignly informing.

Against this favorable picture the writer recalls his experience of a case which demonstrated that while positive roentgen findings are invaluable in diagnosis, there is great danger if inquiry is halted upon findings that are negative. In the case I refer to, radiography of the gastroenteric tract revealed no defect, and a barium suspension enema disclosed no lesion in the colon. Yet an exploratory colostomy performed at the Roosevelt Hospital in New York, revealed that the terminal transverse colon, splenic flexure and all of the descending colon were involved in a massive carcinomatous growth, firmly fixed with metastasis into the small intestine. This case has been etched indelibly in my memory. An important lesson of fallibility and humility.

Wroblewski et al⁶, in their study to define the indications and limitations of exploratory laparotomy, conclude that "It should be considered a last resort and should never be done unless complete laboratory, x-ray, and cytologic studies failed to establish the diagnosis preoperatively". As regards his own case, the writer queried: Did it call for diagnostic modality or conservative therapy? *Achylia gastrica* was found, cytology of gastric contents regrettably omitted. According to Pack⁷ *achylia* places the patient in the "precursor groups who may be expected to develop gastric carcinoma". Wangenstein⁸ declares that "the most important clinical laboratory test is the determination whether the patient is achlorhydric". Referring to precursors he emphatically writes, "There is no common denominator of gastric cancer. It is striking, however, that whereas in extragastric cancers only a third of the patients exhibit histamine achlorhydria or hypochlorhydria, approximately 90 per cent of the patients with gastric cancer fall in this category". As, however, symptoms subsided, conservative management was judged in order, demonstrating that the well-being or response of the patient is one good criterion for evaluating a situation.

SIMILAR CLINICAL BEHAVIOR OF TWO EPISODES WITH A LONG INTERVAL OF WELL-BEING

Where a single x-ray examination of the gastroenteric tract yields no anatomic evidence of disease, the patient should none the less be kept under observation. As the late Carmen said: "The eye of the Coolidge tube is mechanical and not analytical". The recent episode was similar in pattern of onset and behavior as the first. It must be remembered, however, that the stomach is not

just a static organ, a mere chemical retort, but a functioning, dynamic apparatus, sensitized to respond to stimulus from any source, and that an over-all survey of the alimentary canal is urgently called for. Although pylorospasm to which nonretention might be gleaned at first impression, but *anatomic* disease accounting for nonretention of food must be thought of, with the gloomy profile of malignancy. The "mild anemia" found might be ascribed to a long achlorhydria contrasting with hyperchlorhydria of similar episode of 15 years ago. *Achylia*, however, figured as benign, and age was held to account for a depression of glandular activity of the acid secreting cells. Thus x-ray negativity, coupled with the negative aids, undoubtedly piloted against an exploratory.

Surgeons rightly complain that internists do not send them cases of gastric carcinoma sufficiently early and *timely*, the latter designation as regards an absence of adenopathy to effect a "cure". But it must not be forgotten that patients do not come to the physician early enough, and when they do, the physician is apt to be insufficiently cancer-minded until discernible complaints appear,—earlier when either extreme is implicated, later, when the pathology is in a relatively silent area. The patient who states that his stomach symptoms are of short duration and that never before in his life had he suffered from digestive aberrations, that he was previously able to "digest tacks", may be adding to his "euphoria" the quality of complacency. This individual needs a vigil concern. An atypical history often stymies early detection, unless counter-balanced by a high index of suspicion.

In my earlier writing I remarked, "If we are to consider cancer chronologically, I would like to coin the expression 'cancer time' for the days and weeks lost before the patient with cancer symptoms comes to the physician and before the physician refers him to the hospital". With this picture in mind, the physician-patient queried, "How did I escape a diagnostic laparotomy?"

EXPLORATORY—ITS INDICATIONS AND ITS LIMITATIONS

In an attempt to define the indications and limitations for an exploratory, Wroblewski⁶, in a study of 50 patients, concludes, "Persistent abdominal pain, despite a battery of laboratory and x-ray studies or inconclusive findings on physical examinations, is sufficient justification for an exploratory laparotomy." In my own case, in spite of the all-including negative study and subsidence of abdominal tenderness, I was nevertheless in agreement with the above writers and their comment that in many instances "too much credence is attached to certain indefinite findings or to a negative study". It is said that there is more rejoicing in heaven over the one laparotomy that fails to find cancer than over the 99 that find it too late. Wangenstein's reference to a poem by Theodor Storm, who died of gastric cancer, reverberated on my tympanic membranes: "(1) It is a prick, (2) it is nothing, (3) it is too late."

SENSITIVITY OF THE INDEX OF SUSPICION

Speaking of gastric cancer, Pack⁷ comments: "Although still a formidable and usually fatal disease, the gastric cancer picture is not at all hopeless"; that is, if the consultant in the problem is equipped with a high index of cancer-mindedness, and makes thorough inquiry into the precursors of an approaching dilemma. A digestive aberration, however mild, but veering toward chronicity, beckons for an investigation. Nondebtable criteria of malignancy may not be obtainable by sleight of hand, but it should be remembered that the easier it is to diagnose, the harder it is to operate on it. To quote Pack⁷ "Analysis of responsibility for delay in the treatment of cancer (based over a ten-year period) showed a progressive improvement on the part of the lay public in avoiding this delay. Unfortunately, there has not been equally great improvement on the part of the physician first consulted; and, sad to relate, for the physician who is a cancer patient himself, the period of delay between the first symptom and the time he went to the doctor was as great as it was for the lay public". Evidently, the index of suspicion is as yet regrettably low.

In a case report of the writer⁹ the x-ray picture pointed to healing of a carcinomatous gastric ulcer, *assumed to be benign*, "the ulcer appeared to be becoming smaller and smaller as evidenced by repeated x-ray examinations", while the actual condition was progressive with metastasis. The attending physician, closely related to the patient, *had watched the ulcer but not the patient*. While under observation the patient suffered massive gastric hemorrhages, from which he died. An autopsy proved the presence of malignancy with metastasis. I wrote, "To regard diminution in the size of a filling defect as evidence of repair is permissible. However, to conclude, when such repair takes place, that the condition is ulcer and not cancer, is a dangerous half-truth." Myers¹⁰ correctly asserts "The disease progresses so fast that the emphasis in the future will have to be on the vague early symptoms; if they have persisted longer than a week, a thorough examination is required." His analysis of histories of 106 patients with gastric cancer showed early symptoms that brought the patient to the physician. Sixty-five per cent of the cases were inoperable. Meyers constructively stated, "The chief deterrent to cure is delay in diagnosis." MacCarty states emphatically that cancers are not recognized early by the medical profession and "never will be, until it learns that there are no characteristic signs of early cancer."

In search for culpability in delay in early diagnosis, the writer and his associates¹¹ reviewed 104 cases, in a metropolis seething with scientific progress. The study absolved the hospital internists of the fault of late diagnosis, as the patients reached them in a stage of desperation. It is deplorable that procrastination is a cause all too common among patients in lower income brackets. Evaluation of their symptoms led to the conclusion that they were unequivocally textbook replica,—a tragic feature in modern medicine. One of our patients must have been submerged clinically from a gastrointestinal standpoint, and it was a

circulatory bankruptcy and not his advanced malignancy that brought him to the hospital.

In a study of cancer in 41 *physicians*, in contrast to lay patients, Alvarez declares that he is puzzled. Did this group expect cancer in its incipency? Did they expect a progressive dyspeptic syndrome? Did they promptly admit themselves for investigation? They did none of these things. What, then, may we expect from the lay patients who are so poorly informed of the ravages attending delay? The best we can ever hope to do for patients who come to us in their declining years is, in the words of William J. Mayo¹², "to cure sometimes, alleviate often, comfort always".

Often, trivial symptoms are like white-capped waves which appear hours before the onset of a storm. They must be respected. Pain should not necessarily be regarded as an early symptom in gastric cancer. "Who, at operation or necropsy, has not viewed with surprise, tremendous cancers involving most of the stomach, which have produced no pain whatsoever?" queried Rivers and Dry¹³. As regards age, some one sagely said: A man of 40 who bore cancer for one year, is surgically older than the man of 70 who has had his cancer for a month.

DEFINITION OF TERMS

The terms "early" and "timely", upon analysis, take on new shades of meaning. "Early" may imply a clinically well-documented diagnosis. "Timely" intimates an absence of the anatomic complications of gastric carcinoma, such as pyloric obstruction, gastric hemorrhages, adenopathy, contiguous or distant metastasis. For the former, therapy is either medical sedation or surgical palliation. In the latter, cure may be prognosticated. If, in addition to a timely diagnosis, there appears a grade 1 or 2 carcinoma, as classified by Broder—cell differentiation and nondifferentiation—a cure and a long postoperative survival is in the offing as the probable outcome. Dominated by the above thoughts, the writer was covertly prepared for an exploratory procedure, and played the role of a passive cooperative patient. Finally, the terms "early" and "timely" are not interchangeable. There may be early and timely diagnosis, but late for cure. When symptoms are vague, a careful examination may make a timely diagnosis for gastric carcinoma.

TUBELESS GASTRIC ANALYSIS

To avoid the disadvantages of intubation, the method of tubeless gastric analysis is being popularized in current medical literature. Admittedly, intubation is a discomfort to some patients, and we are not unaware of the contraindications to this procedure. Tubeless analysis, however, it may be pointed out, is achieved only at the expense of an adequate interpretation of the gastric chemistry. Awareness of the incidence of gastric carcinoma is significantly

higher in *achylia gastrica*. Cytodiagnosis of gastric carcinoma—a sadly neglected procedure of a relatively simple test in search of aberrant cells—in differential diagnosis between benign and malignant *achylia*, is palpably precluded. Despite its discomfort to the rebelling patient, intubation truly proffers a more comprehensive evaluation of gastric secretory chemistry. Research Reviews¹⁴, favoring tubeless gastric analysis, writes approvingly of “oral administration of Azure A resin compound and appraisal of the color change in the urine” but concludes with the remark: “The validity of the test is doubtful in the presence of gastric obstruction, diarrhea, malabsorption, and severe renal and liver disease.” Recht-schaffen, Venet and Weingarten¹⁵ emphatically state: “These writers take no appraisal of the added information unobtainable in a tubeless procedure. The adequacy in making a differential diagnosis between benign *achylia* and malignant *achylia*, makes intubation a screening procedure worthy of emphasis.”

In cases with well-defined contraindications to orthodox intubation, the writer has on occasions resorted to the Sahli Desmoid procedure, but with much equivocation in ensuing results. The test for occult blood is a lead in the diagnosis, readily omitted in a tubeless procedure. Added to the fact that the indirect method is not suitable for the quantitative measurement of HCl secretion, the information offered by passage of the tube at the cardia, visual appraisal of recovered contents, and cytodiagnosis, are persuasive arguments in favor of the direct method as against the indirect.

Cozier et al¹⁶ at the Lahey Clinic consider gastric lavage with isotonic chloride solution a “simple, comparatively reliable method for cytological examination, . . . most useful to substantiate the clinical impression of a malignant lesion, and on occasion, to diagnose an early, unsuspected gastric cancer”. Negative findings in this procedure would add considerable reassurance to a patient who is advised to go on conservative therapy. As the writer sees it, gastric analysis has been underrated to the extent that physicians have been enjoined to discard it as a routine. “We don’t do it here” is a current statement, shocking to the writer’s ear, since it emanated from delvers in the problems of gastroenterology.

Three decades have passed during which the writer¹⁷ has been highly rewarded in the study of gastric analysis as a screening test. It was his belief, as it is now, that this deliberate nonacquaintance with the study of gastric analysis has developed, by subconscious mutation into an attitude of belittlement of its diagnostic worth. It is the process of simple mental transformation of the concept “It is difficult”, into “I am not interested”, and thence, “It is no good”. I presume we are all familiar to a degree with this type of mental evasion.

As the late John B. Deaver said: “Take the stomach tube from the surgeon or the test tube from the clinician, and neither could any longer approach the desired 100 per cent efficiency”.

SUMMARY

Two episodes are reported, similar in onset, suggestive of a pyloric lesion, with a long asymptomatic interval.

Unlike a symptom-complex capable of invoking diverse clinical pictures, the triad comprising anorexia, loss of weight, and marked asthenia, warrant a high suspicion of malignancy.

Though an acute onset is more in concert with nonmalignant condition, a lesion resident in a silent area of the stomach should arouse suspicion of malignancy when considered in terms of the patient's advanced age.

An apparently short history in a subclinical individual may, in reality, be of many months' duration.

While we must remain on guard in younger patients, a redoubled watchfulness is to be exercised in those who are older.

Caution must be exercised when a grave condition is tentatively thought of, for *lapsus linguae* is fraught with unnecessary anguish. Cancer-phobia anxiety is not a rare occurrence and may be designated as *iatrogenes*.

The orthodox procedure in gastric analysis offers the clinician the best opportunity for screening a patient in search of the ubiquitous "malignancy".

Gastric malignancy does not operate with a common denominator for all patients, and is but obliquely concerned with textbook description of onset and course.

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TUBERCULOSIS OF THE DIGESTIVE SYSTEM

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The history of tuberculosis began with the appearance of life on this planet. It traces its appalling destruction to the remotest antiquity. It has been the perennial scourge, the grim killer for thousands of years, destroying millions of beings. Humanity marshalled its efforts to combat this disease persistently, courageously, and with all the genius and scientific intellect.

Respiratory tuberculosis is the predominant pathological entity which spreads the germ to other regions. Primary tuberculosis affecting other organs is less frequent. This writing is devoted to the theme of tuberculosis of the digestive system, in an orderly sequence. Discussing an ancient theme in the light of modern concepts is fascinating and informative.

Tuberculosis of the mouth:—This condition is rarely primary, but cases occur where no other tuberculosis focus has been demonstrated. The primary focus may be initially located in the tonsils. Tuberculosis in the form of *lupus* may spread from the face to the mouth. The tongue is seldom affected. Tuberculosis of the lips is occasionally seen in tuberculosis subjects in the form of an ulcer. Miliary nodules may appear in the gums. Ulcerations may occur along the free edges and extend to the hard palate. The condition has followed tooth extraction. The soft palate is also prone to be involved in persons with pulmonary tuberculosis.

The tongue is the commonest seat of oral tuberculosis. The disease appears in the form of subcutaneous nodules which ultimately ulcerate forming shallow, irregular ulcers with undermined edges, and are covered with a grayish-white slough. Very rarely this condition is primary. The differential diagnosis between a tuberculous and malignant ulcer is important. Tuberculous ulcers may be multiple, the edges are softer and less infiltrated; there is less pain; and less frequent involvement of the lymph glands than in carcinoma.

Tuberculosis of the salivary glands:—The salivary glands are often attacked by tuberculosis. The tubercle bacilli may reach the glands through the blood, lymphatics, the excretory duct, or by extension from adjacent parts, carious teeth, or ulcerated gums may allow the infection to enter the glands. Tuberculosis of the salivary glands affects the intra-acinous connective tissue, and is of slow development.

Tuberculosis of the pharynx in the vast majority of cases is secondary to deposits from other parts of the body. The primary form occurs in about one per cent of all cases of acute tuberculous inflammation of the upper air passages. Possible seats of invasion are the uvula, the soft palate, posterior laryngeal wall and hard palate. The constant functional involvement of the organ is the saliva,

and other forms of bacterial life are preventive factors to bacillary growth. Infection may come through the blood, lymph, through infected air, and through food stuffs. The lesion may appear as white miliary deposits or ulcerations. The early symptoms are pain, dysphagia, cough, hesitant speech, and enlarged cervical glands. The prognosis is bad in most cases.

Tuberculous infection of the esophagus occurs infrequently. It develops as an extension from a tuberculous process in the larynx, pleura, bronchi, peribronchial lymph nodes, the lungs, or the vertebrae. The process may be ulcerative, erosive, stenotic, form diverticula or fistulas. The symptoms are difficult and painful swallowing. The diagnosis is confirmed by esophagoscopy and by biopsy.

The stomach is very seldom affected by tuberculosis, and this has been attributed to the bactericidal action of hydrochloric acid and pepsin. Experiments, however, prove that tubercle bacilli are not destroyed by the gastric juice, although they may be attenuated by several hours contact with it. Another possible explanation is the sparsity of lymphoid tissue in the stomach wall. A break in the continuity of the gastric mucosa as a result of erosion, ulcers, or neoplasm is necessary for the tubercle bacilli to gain a foothold. Gastroscopic examination of patients suffering from tuberculosis rarely shows any specific tuberculous lesion of the stomach and if a simple ulcer is present it does not appear to vary from simple peptic ulcer as seen in nontuberculous patients. Criteria for diagnosis of gastric tuberculosis require the demonstration of tubercle bacilli in the histologically tuberculous lesion, or that the tubercle bacilli are imbedded in an indefinite histological lesion.

Since 1934 numerous cases of gastric tuberculosis in conjunction with malignancy were reported in the literature by many investigators. The findings of tubercle bacilli in the gastric contents, or in the feces is not *ipso facto* evidence of gastrointestinal tuberculosis.

The x-ray findings, in spite of some of the reports in the literature, are not pathognomonic to the disease. Gastrointestinal functional disorders are frequent developments in pulmonary tuberculosis patients. There may be fatigue or there may be a toxic basis without being accompanied by actual tuberculous gastroenteritis. A pulmonary tubercular patient may suffer from gastrointestinal symptoms caused by a hiatus hernia, gallstones, cholecystitis, gastritis, infectious hepatitis, regional ileitis, peptic ulcer, carcinoma, idiopathic ulcerative colitis, amebiasis, infectious hepatitis, diverticulitis, and many other lesions of the digestive tract.

The tuberculous lesion of the stomach may appear as tuberculous granulomatous tumor, and pyloric stenosis. Recently, due to formidable surgical procedures many cases have been reported and are classified as surgical and non-surgical. The surgical are the rarest, and are the primary lesions of the stomach; the secondary are those of the latent and active tuberculosis foci, primarily of

the lungs. Gastric tuberculosis may be caused by ingestion of infected food, especially milk, deglutition of tuberculous sputum, through the blood stream, lymphatics, lymph nodes, spleen, transverse colon, or the liver, propagation from the duodenum, or from the peritoneum. Gastric tuberculosis assumes three forms, ulcerative, hypertrophic, and scirrhus.

Healed or active pulmonary tuberculosis patients who experience anorexia, diarrhea, and abdominal pains, most likely have tuberculous gastroenteritis. If the patient was improving, and developed sudden temperature rise, which was irregular, or if the patient started on a downward course, ulceration of the bowel must be suspected, when sudden and continued diarrhea develops, particularly following the ingestion of rough, or raw food, or cold liquids. Fear of eating because subsequent or exaggerated existing cramp-like pain in the lower abdomen or in the right lower quadrant, is strongly indicative of gastroenteritis. Should the pain become worse, persistent, and localized, and accompanied by temperature rise with nausea and vomiting, there is a great likelihood that an ulcer is penetrating, and peritoneal irritation has developed.

Miliary tuberculosis of the pancreas in association with acute or chronic tuberculosis of other organs is not uncommon, as a formidable process. Large tubercular lesions are uncommon. It causes pain and vomiting. The process may be of gland involvement or tuberculoma. Tuberculous infection of the peritoneum is common, occurring in 9 per cent of the fatal cases and being more common in cirrhotic males than in other male subjects, and is often responsible for the fatal issue. It is sometimes latent and found only at necropsy; in other cases it dominates the clinical picture. The process may be acute or chronic, latent or obvious and it leads directly to death from 12 to 15 per cent of the cases of cirrhosis.

Tuberculosis of the liver:—Fatty liver may be caused by anemia and cachexia of tuberculous affections of the lungs, bones, joints, and lymphatics. Primary tuberculosis of the liver is rare. Small healed primary tubercles not infrequently occur in the liver, consisting of hyaline connective tissue, with a caseous center. The liver possesses a high resistance to tuberculosis. In maternal tuberculosis the liver of the fetus contained a great number of tubercle bacilli without histological lesions of tuberculosis. Probable congenital tuberculosis, in which tubercular lesions are found in the liver, are transmitted through the umbilical vein from the placenta, causing hepatic tuberculosis. Primary tuberculosis is rare, and secondary involvement is most common. A great number of miliary tubercles are found in this organ in acute miliary tuberculosis and also in chronic pulmonary and bone tuberculosis. In the great majority of cases their presence can be demonstrated only by microscopic examination. The large tubercles are grayish, semitranslucent, with yellowish opaque centers. Occasionally large caseous nodules are found, and less frequently tuberculous cavities or abscesses.

In pulmonary and bone tuberculosis, and general miliary tuberculosis the infection of the liver is usually through the hepatic artery: in the case of intestinal tuberculosis it may take place through the portal vein, or lymphatics. Thrombosis and injury to the capillaries as a result of toxin formation may injure the liver cells. Amyloid disease of the liver and amyloid degeneration may also be caused by chronic long standing tuberculosis. Here the liver is enlarged, painless, smooth, and firm. There is no jaundice. There is also albuminuria and diarrhea.

Tuberculosis of the ileocecal area:—This condition may result from ingestion of the organism, or from a hematogenous spread from another focus, or from direct contact from the Fallopian tubes, or from tuberculous peritonitis. This type is more frequent in children, caused by the bovine strain from infected milk or butter. The lesion occurs in this organ because of the physiologic stasis, and the abundance of lymphoid tissue. The pathology is ulcerative and hyperplastic. As the process develops, adhesions, fistula formations, abscesses between the adherent loops of the bowels or other organs, perforation and hemorrhage may take place. Healing occurs with fibrosis, resulting in contraction, kinking, and adhesions. Amyloid degeneration of the mucosa may take place causing stubborn diarrhea. The symptoms are pain which varies in intensity and is located at the right lower quadrant or periumbilical. The pain bears little relation to the time of eating or the type of food. The pain may be associated with distention, vomiting, constipation, and attacks of pseudoappendicitis, recurrent bouts of diarrhea, rise in temperature, emaciation, elevation of the sedimentation rate, and increase in monocytes. The diagnosis is made by x-ray, which reveals spasm of an incompletely filled cecum, associated with a fixed, rigid, irregular, deformed ascending colon.

Intestinal tuberculosis is a common complication of pulmonary tuberculosis. It is found in 65 to 80 per cent of tuberculous patients at autopsy. This condition should be suspected in a patient with active pulmonary tuberculosis who develops gastrointestinal complaints as anorexia, nausea, vomiting, abdominal pain, diarrhea, or constipation. It frequently happens that gastrointestinal tuberculosis is asymptomatic. Intestinal tuberculosis is now usually regarded as a relatively minor problem not because it is seen less frequently but also because of the satisfactory response to various chemotherapeutic agents.

Tuberculosis of the intestine may result from ingestion of tuberculous meat or milk, as distinguished from secondary intestinal tuberculosis which resulted from an infection of some part of the intestinal tract, from a previously existing focus, from swallowing bacillus laden sputum, from tuberculous peritoneum, or abdominal lymph nodes. The most frequent localization of tuberculous ulcers is the ileum just above the ileocecal valve.

Tuberculosis of the appendix is occasionally met with at operation and autopsy. It is found in 2 per cent secondary to intestinal and pulmonary tuber-

culosis. It may occur independently, but more commonly is found in association with tuberculosis of the cecum. The symptoms may be indistinguishable from those of ordinary appendicitis. At times a decided enlargement of the lymphatic glands is present, with tuberculous abscess formation.

X-ray studies are important adjuncts but not definite in the diagnosis of this disease. Segmentation and dilatation of the small intestines, a string-like sign at the ileocecal juncture, barium in the terminal ileum on nine hours' study, a poorly outlined cecum with a reasonably well outlined ileum and a descending colon, or a completely visualized colon at 12 hours that becomes practically completely empty in 24 hours, are significant. These may be considered as suggestive of tuberculous enteritis in the healed or active cases of pulmonary or other known existing tuberculosis.

It should be considered that regional ileitis, amebic colitis, enteritis, carcinoma, idiopathic ulcerative colitis, functional gastrointestinal disorders, allergy, may give a part or all of the x-ray pictures described, and may exist with tuberculous gastroenteritis. A characteristic symptom which aids in the diagnosis is pain of varying intensity in the lower right abdominal quadrant usually appearing about the time when the gastrocolic reflex occurs, 20 minutes after a meal, may indicate ileocecal tuberculosis. It is due to peritoneal irritation from the enlarged tuberculous gland upon contraction of the cecum.

Patients with pulmonary tuberculosis may develop one or more extrapulmonary lesions especially in the terminal bowel. The complaint of a tender hemorrhoid may turn out to be a tuberculous abscess. This may begin with a localized painful swelling, acutely tender, which if not incised may rupture, and discharge an odorless purulent material in which tubercle bacilli may be demonstrated. It has been variously estimated that between 5 to 11 per cent of anorectal fistulas in a tuberculosis hospital are tuberculous in character. In a series of patients 89 per cent of advanced pulmonary tuberculosis reveals an incidence of over 30 per cent had tuberculous abscess, sinus, or fistula, and other ulcerative anorectal lesions.

Infection of the anorectal region with tubercle bacilli may come from the bowels. The tubercle bacilli can easily withstand gastric and intestinal digestion from the swallowed sputum. Infection with bovine tubercle also occurs from heavily infected milk, which lodge in the anal crypts without any pulmonary or intestinal focus. Blood stream deposition of tubercle bacilli from a distant focus; the bacilli becoming established in the submucous layer of the rectal wall, causing a rectal or anal infection and ulcer. Direct extension of tuberculous disease from the prostate and seminal vesicles may cause a deep sinus anterior to the anus. A tuberculous abscess from caries of the spine or pelvic bones may ultimately discharge on the surface of the anal area or form an ischiorectal abscess. Direct inoculation from sputum-infected fingers, and rectal thermometers may also take place. The usual infection is the swallowing of

sputum containing tubercle bacilli which contaminate the feces of the lower sigmoidal colon and rectum. Tuberculous anorectal lesions commonly encountered are: perianal abscess, fistula or abscess, anal fissure or ulcer, or tubercule.

The diagnosis of this condition can often be made on clinical grounds alone. A tuberculous sinus has undermined skin edges, smooth external opening, with a characteristic cyanotic appearance. There is absence of induration and fibrosis. The violet or purplish color of the tuberculous granulations is pathognomonic of tuberculous infection. Microscopic examination reveals the presence of Langhans type of giant cells, surrounded by epitheloid cells which may contain tubercle bacilli.

CONCLUSION

Tuberculosis of the digestive system is frequent, predominantly a secondary manifestation. This condition has frank and definite symptoms. The primary pathology may be caused by the ingestion of infected tubercular food, hemic, lymph, and direct inoculation. The digestive apparatus seldom escapes entirely this implication. The diagnosis of this condition is not beset with difficulties, if awareness is prevalent. Still many instances of phthisis of this region have been revealed only on necropsy or laparotomy.

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CLINICAL EVALUATION OF PAPER ELECTROPHORESIS

IV. THE FINDING OF ABNORMAL PROTEIN COMPONENTS IN A CASE OF VIRUS HEPATITIS AND LAENNEC'S CIRRHOSIS (REPORT OF TWO CASES)

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The increased sensitivity of paper electrophoretic studies over blood chemical fractionations as well as liver function determinations has become more and more apparent within recent years. In addition paper electrophoresis is rapid, simple and can be carried out with much ease as well as little expense. It plays an important role not only in diagnosis but in prognosis as well.

The following two cases not only illustrate abnormal percentages of the electrophoretic patterns for the usual serum protein components, but show two unusual protein components which roles have not been definitely established but which may have significant diagnostic and prognostic implications.

METHOD OF STUDY

The blood samples were analyzed by the Durrum** type of paper electrophoretic apparatus¹. A more detailed description of this method was mentioned in previous publications²⁻⁵.

CASE REPORTS

Case 1:—Viral hepatitis. R. R., age 24, a white male medical student was admitted to Flower-Fifth Avenue Hospital, 18 December 1955 with symptoms of anorexia, dark urine and fever of one week's duration. This was accompanied by malaise and two episodes of vomiting.

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**Spinco Model R. Paper Electrophoresis Apparatus, Scientific and Precision Instrument Co., Palo Alto, Calif.

Physical findings:—The patient appeared drowsy, weak and generally ill. His sclerae were slightly icteric. He exhibited an injected pharynx, posterior cervical adenopathy, epigastric tenderness, and an oral temperature of 102.4° F. Two days later right upper quadrant tenderness to palpation appeared.

Hospital course:—Under routine and conservative therapy, there was an increase of the serum bilirubin, the thymol turbidity, and alkaline phosphatase

TABLE I
LIVER FUNCTION TESTS

| Subject | Date | Ceph. Floc. | Thymol Turb. | Alkaline* Phos. | Icterus Index | Bili-rubin | Choles-terol | Chol. Esters | Free Chol. |
|------------------|----------|-------------|--------------|-----------------|---------------|------------|--------------|--------------|------------|
| Case 1 R.R. | 12/27/55 | 3+ | 30 | 41 | 40 | 12.96 | 288 | 63 | 225 |
| | 1/9/56 | 3-4+ | 15 | 28.4 | 20 | 3.15 | 296 | 224 | 72 |
| | 2/14/56 | 3+ | 20 | 19 | 9 | .39 | 256 | 208 | 48 |
| | 3/13/56 | 3+ | 20 | 20.7 | 5 | 1.11 | 236 | 178 | 58 |
| | 5/27/56 | neg. | 9 | 13.1 | | | | | |
| | 1/7/57 | neg. | 6 | 11.8 | | | | | |
| | 6/6/57 | | 5 | 13.5 | 4 | .74 | 225 | 187 | 38 |
| Case 2 F.L.C. | 12/9/55 | 3+ | 4.7 | 2.5** | 33 | 6.4 | 260 | 117 | 143 |
| | 1/11/56 | 4+ | 6 | 1.0** | 11 | | 220 | 142 | 78 |

*King-Armstrong Units

**Bodansky Units

reactions, with a marked drop of the cholesterol ester (Table I). A febrile course was also present. ACTH and cortisone therapy were given over a two-week period because of the lack of response to the initial treatment. The patient was discharged to home care after a month of hospitalization with clinical improvement.

Laboratory findings:—There was marked hepatocellular damage as well as jaundice which receded in the latter course of his hospitalization. The hetero-

TABLE II
COMPARISON OF SERUM PROTEIN FRACTIONATION VALUES BY
FILTER PAPER ELECTROPHORETIC AND CHEMICAL METHODS

| Subject | Date | Albumin | Paper Electrophoresis—Relative Concentration in Percentages | | | | | | Chemical Method—gm. per 100 ml. | | | |
|------------------------|----------|---------|---|---------|-----|-------|-------|-------|---------------------------------|---------|----------|-----------|
| | | | Globulins | | | | | | Total Proteins | Albumin | Globulin | A/G Ratio |
| | | | Alpha-1 | Alpha-2 | Pi | Beta | Delta | Gamma | A/G Ratio | | | |
| Normal | | 40-45 | 3-8 | 10-15 | 0 | 17-23 | 0 | 20-25 | 0.72 | 7.01 | 4.23 | 2.78 |
| R.R. Case 1 | 12/27/55 | 21.6 | 7.3 | 10.3 | 3.8 | 8.9 | 10.3 | 37.8 | 0.28 | 7.00 | 2.40 | 4.60 |
| | 1/9/56 | 24.9 | 8.2 | 13.7 | 0 | 13.8 | 5.2 | 31.4 | 0.33 | 6.62 | 3.98 | 2.64 |
| * | 6/6/57 | 48 | 4.0 | 12.0 | 0 | 15.0 | 0 | 21.0 | 0.92 | 6.40 | 4.19 | 2.21 |
| F.L.C. Case 2 | 12/20/55 | 20.8 | 11.1 | 7.9 | 0 | 15.9 | 12.1 | 31.6 | 0.27 | 5.75 | 2.49 | 2.66 |
| *Spectrometric Technic | | | | | | | | | | | | |
| Normal | | 55-65 | 12-15 | | | 12-15 | | 10-15 | | | | |

phile agglutination titer was within normal limits and no Downey cells were seen. No anemia was present.

Serum protein patterns as determined by paper electrophoresis and chemical fractionation:—On 27 December 1955 the albumin level was reduced to one-half of the normal value as was the beta globulin component. The gamma globulin was markedly elevated and two unusual protein components appeared. One was pi globulin between alpha-2 globulin and beta globulin and the other was delta globulin represented by a boundary between the beta and gamma components (Fig. 2). The chemical determinations showed a decreased albumin and an increased globulin but this A/G ratio was twice as high as the electrophoretic determination (Table II). The normal electrophoretic components for comparison are shown in Figure 1.

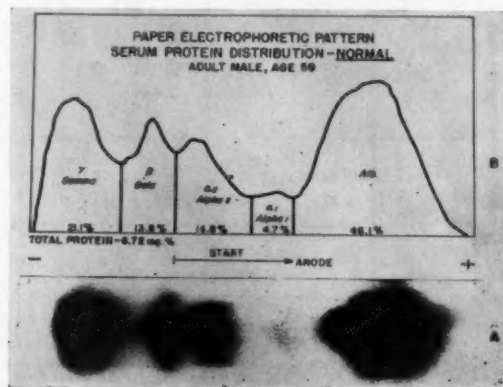


Fig. 1—Comparison of dyed filter paper electrophoretic pattern (a) and corresponding densitometered and planimetered pattern (b) of serum proteins in a normal adult male, age 59. The five normal bands of the serum proteins are present.

Approximately 2 weeks later and after a course of ACTH and cortisone therapy the albumin had risen slightly as had beta globulin even though both were still far below normal values (Fig. 1). Gamma had fallen moderately but was still above the average level. Delta had decreased by one-half (Fig. 3).

The chemical determination showed an increase of albumin with a concomitant decrease in globulin and an A/G ratio of 1.5:1 while the electrophoretic A/G ratio was still inverted, 0.33:1 (Table II).

A little over 18 months after the onset of illness the albumin was still far below normal values and the gamma was significantly elevated. The delta peak had disappeared (Fig. 4). It should be mentioned that this paper electrophoresis was performed by another technic. Consequently, the range of normal values differs from the previous determinations (Table II).

Case 2:—Laennec's cirrhosis. F. L. C., age 62, a white male was admitted 28 November 1955 for the second time to Metropolitan Hospital because of bloody stool.

He had a 20-year history of heavy drinking associated with poor food intake. The past two years he had developed ascites, leg edema, and jaundice. He had an episode of hematemesis which preceded his melena by one year. The patient was observed under home care during this time interval.

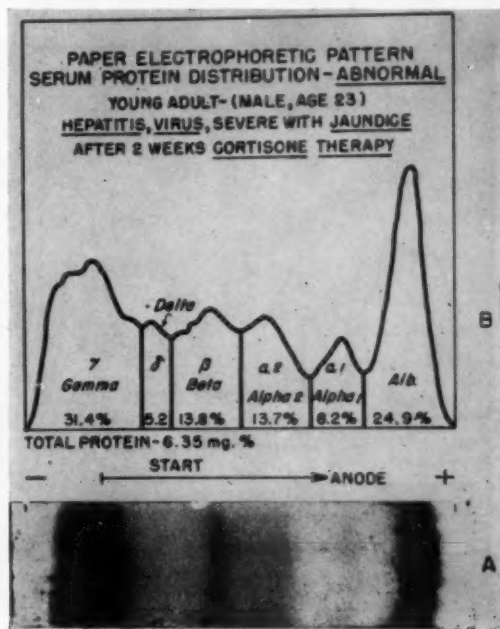


Fig. 2—Comparison of dyed filter paper electrophoretic strip (a) and corresponding densitometer and planimetered serum protein pattern (b). Case 1, R. R., young adult male age 23. Diagnosis: hepatitis, virus severe, with jaundice. Pattern shows a markedly decreased albumin and beta; markedly increased gamma components. Abnormal components are π pi, and δ delta.

Physical findings:—The sclerae were slightly jaundiced and the liver was four fingers below the costal margin. Ascites and leg edema were present.

Hospital course:—The patient became semicomatose, developed a sharp rise in temperature and went into shock two months after admission. Slight anemia was present.

Postmortem examination:—Laennec's cirrhosis and esophageal varices were the pertinent findings.

Laboratory findings:—The cephalin flocculation test was 3-4+ during the course of his last admission and the serum bilirubin was elevated. The sedimentation rate was 54 mm./hr.

Serum protein patterns as determined by paper electrophoresis and chemical fractionation:—On 20 December 1955, the paper electrophoretic pattern showed a decrease in albumin and the alpha-2 and a marked increase of the gamma globulin components. An abnormal component, the delta appeared between the beta and gamma globulins. The A/G ratio was reversed (Fig. 5).

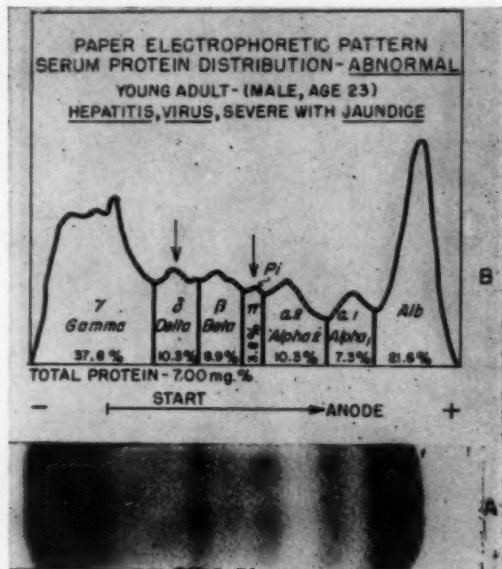


Fig. 3—Case 2, R. R.—Hepatitis, virus, severe with jaundice. After 2 weeks intensive cortisone therapy. Albumin still markedly diminished and beta less diminished than before (Fig. 2). Gamma component is markedly elevated. Abnormal component, pi π is absent. Only abnormal component present is delta δ .

By chemical determination the albumin was markedly decreased and the globulin was slightly decreased. The A/G ratio was 0.93 far above the ratio value as determined by electrophoresis (Table II).

COMMENT

Normal paper electrophoretic components:—**Albumin:**—Our study shows that in the viral hepatitis patient (Case 1) normal chemical determinations were present for albumin and globulin while electrophoretic protein values still showed abnormalities. In those instances where the chemical determinations of

albumin and globulin were abnormal, the electrophoretic values showed greater degrees of abnormality and this was reflected in higher reversal of the electrophoretic A/G ratio (Table II).

The albumin was decreased in both cases of cirrhosis and viral hepatitis as well as other forms of liver disease⁶⁻¹². Our previous work in liver disease shows a decrease of albumin below normal levels in 85 per cent of the cases⁴.

Since albumin is fabricated by the liver cell it can be assumed that damage of these cells or replacement of them by fibrotic tissue would result in a lower albumin value. Chronicity will have a more marked influence upon albumin decrease than will severity of the disease.

Alpha components:—We found no significant alteration in the alpha globulin component in the viral hepatitis patient but there was a drop in the alpha-2

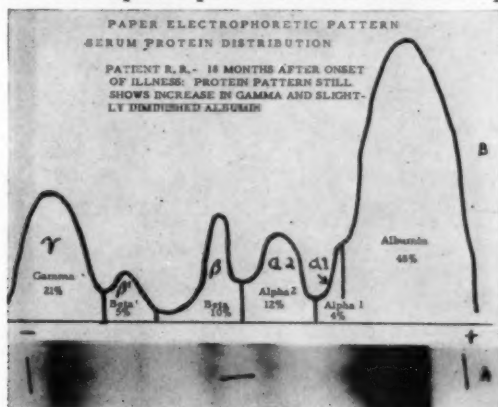


Fig. 4—Paper electrophoretic pattern of Case 1, R. R. 18 months after illness. Serum protein distribution still shows increased gamma and slightly diminished albumin components.

globulin in the cirrhotic patient. It has been noted that the alpha falls when there is marked hepatic cell damage and that the more extensive the liver damage the more marked is the decrease of the alpha components^{10,12,13}.

The above finding was not observed in our previous work in which only 63 per cent of liver diseases studied showed an increase of the alpha group⁴. The alpha globulin was increased in inflammation and infections or as a reaction to immunization procedures³.

Beta component:—In the infectious hepatitis patient (Case 1) the beta globulin component was decreased. Beta globulins may be increased in infections and inflammatory diseases and in association with an accumulation of lipoproteins of the blood. An increase of beta globulins may be indicative of a reaction between antigens and their specific antibodies.

A decrease in beta globulin may be encountered in diffuse and fulminating hepatitis¹². This may be observed in our case of viral hepatitis (Case 1).

Gamma globulin component:—The gamma globulin was increased in both cases but decreased in the viral hepatitis patient toward the end of convalescence even though it still remained above the normal value.

In our previous study gamma globulin was 75 per cent above normal values⁴. The gamma globulin has been noted to increase after the decrease occurred in viral hepatitis. It has also been observed that the more severe cases of hepatitis were associated with a higher electrophoretic gamma globulin than milder cases, and that convalescent cases of severe viral hepatitis still had

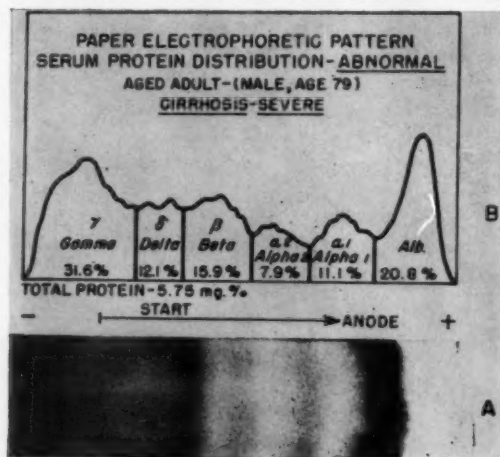


Fig. 5—Comparison of dyed filter paper electrophoretic strip (a) and corresponding electrophoretic pattern (b) of serum proteins. Patient, L. C.: Adult male age 79. Diagnosis: cirrhosis severe. Pattern shows markedly diminished albumin; moderately diminished alpha-2, with markedly increased gamma globulin components. There is an abnormal delta δ component present.

elevated levels. In cirrhosis the gamma globulins were very high, and in cases of cirrhosis with jaundice and ascites some of the highest gamma globulins were found⁶⁻¹².

The increase of gamma globulin in liver disease is caused by the mesenchymal reaction of Kupffer cells and histiocytes within the portal triads to stimulation produced by liver cell breakdown products. These cells (the Kupffer cells and histiocytes) become rich in cytoplasmatic ribonucleic acid which is considered an indication of cytoplasmic protein formation. In nonhepatic diseases there are extrahepatic sites which account for elevated gamma globulin production in the same manner¹⁰. Others maintain that an elevated gamma globulin level suggests a typical antibody response¹⁴.

ABNORMAL PAPER ELECTROPHORETIC COMPONENTS

Pi component:—In the viral hepatitis patient (Case 1) the first electrophoretic study showed a pi globulin component between alpha-2 and beta globulins. This was observed in the early course of the disease, disappearing two weeks later. An abnormal globulin of the same mobility range was observed by Sullivan and his coworkers in infectious mononucleosis and infectious hepatitis¹³. The above observers noted, as we did in our study, that it was present only in the early stages of illness.

Some consider the pi globulin component to be part of the beta globulin component. It may resemble the "X" of Li¹⁶ or of Pederson¹⁷ which is a beta globulin component (Fig. 6).

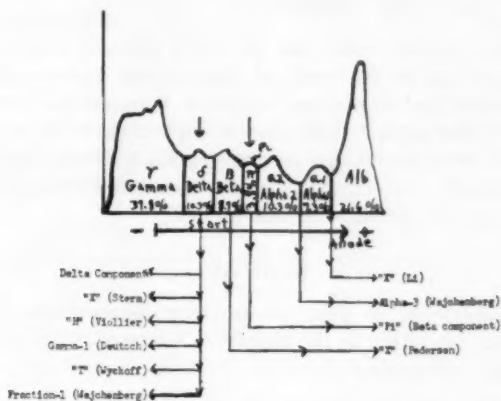


Fig. 6—Abnormal serum protein electrophoretic components of similar migrating mobilities.

Stern *et al*²⁴ have reported a "U" protein between alpha-2 and beta globulins observed in sera of normal infants and children and found often in sera of children with chronic glomerulonephritis and nephrotic syndrome.

In primary systemic amyloidosis Block *et al*²⁵ observed an alpha-2 component migrating between alpha-2 and beta globulins while Matsui *et al*²⁶ in Japan have noted a similar component in tuberculosis which they called alpha-3 globulin.

Delta component:—A delta globulin peak appeared between beta globulin and gamma globulin early in the viral hepatitis case (Fig. 2) and decreased to one-half its original size after two weeks of cortisone and ACTH therapy (Fig. 3). It disappeared after 18 months from the onset of illness in the viral hepatitis case (Fig. 4). This same delta globulin peak was evident in the case of Laennec's cirrhosis (Fig. 5).

Other investigators have reported this unusual component in infectious mononucleosis¹⁸ and infectious hepatitis¹⁹. In only one of these cases in which the studies were repeated 26 days later did the delta globulin peak remain¹³. This protein corresponds to Wajchenberg's Fraction-1 globulin¹², Deutsch's gamma-1 fraction²⁰, Stern's component "X"¹⁵ and Viollier's "factor H"¹¹ (Fig. 6).

In the field of animal investigation Wyckoff's group found that antitetanus and various antibacterial horse sera show a new component called "T" corresponding to the delta globulin^{21,22} (Fig. 6).

The delta globulin component is frequently found in diseases characterized by an increase in the gamma fraction. In viral hepatitis its presence is probably due to the formation of antibodies, while in Laennec's cirrhosis the liver has been unable to metabolize the products of protein degradation, and these products are acting as autogenic antigens.

Other evidence which would link the delta globulin component with antibody formation is seen in the work of Tiselius and Kabat who found in the horse that pneumococcal antibodies migrated between the beta and gamma globulins²³. Since then equine antibodies to diphtheria toxin, tetanus toxin and other toxins have been found outside the gamma globulin fraction as has the Wassermann antibody (or reagin); Deutsch associated typhoid "O" agglutinin and hemagglutinins of plasma with this globulin²⁰.

SUMMARY

Paper electrophoresis in liver disease may demonstrate the presence of abnormal globulins migrating in the mobilities intermediate to alpha-2 and beta, and between beta and gamma globulins.

The abnormal components encountered in the two cases presented as well as other cases of liver disease demonstrate a similar range of migrating mobilities (Fig. 6). The "X" component of Li has a mobility between albumin and alpha globulin¹⁶. The alpha-3 of Wajchenberg and associates between alpha-1 and alpha-2 may be increased in massive diffuse liver necrosis. The "X" protein of Pedersen corresponds to the beta globulins. The "pi" component may be observed between alpha-2 and beta globulin. Some consider it as part of the beta component. Beta globulins are decreased in diffuse liver necrosis and marked liver function disturbance as in Case 1.

Most antibodies are present in the gamma globulins. Some maintain that an elevated gamma globulin level suggests a typical antibody response. Others postulate that the increased gamma globulin values are due to stimulation by liver cell breakdown products rather than as a result solely of antibody formation.

The abnormal globulins encountered in the patients,—of "delta",—were observed between the beta and gamma regions. The range of migration is similar

to other abnormal components reported: namely the "X" of Stern, "H" of Viollier, gamma-1 of Deutsch, Fraction-1 of Wajchenberg, and "T" component of Wyckoff. Its significance may be explained on a two-fold basis,—since it appeared in two different liver conditions and ages; namely,—viral hepatitis in youth, and Laennec's cirrhosis in an aged individual. The increase in the case of viral hepatitis may indicate the formation of antibodies. In the patient with Laennec's cirrhosis, it may mean that the liver has become unable to metabolize the products of protein degradation and these products would be acting as autogenic antigens.

Increased gamma globulin was present 18 months after illness, while all chemical fractionations and liver tests were normal. This may be a reflection of reticuloendothelial proliferation rather than liver damage. The paper electrophoresis was a method revealing more information to the clinician than the other laboratory procedures.

CONCLUSIONS

1. A viral hepatitis case and a Laennec's cirrhosis case were studied for serum protein electrophoretic components and protein chemical values as well as for liver function studies.
2. The chemical protein determinations were normal when abnormal electrophoretic components were present, and the former showed less changes than the latter.
3. The electrophoretic components were discussed and compared with previous studies. Explanations for their behavior were offered.
4. A pi component between alpha-2 and beta globulins was observed early in the virus hepatitis case, and it soon disappeared. Its significance is not known.
5. A delta boundary between beta and gamma globulins appeared in both cases and may be related to antibody formation.
6. Fractionation of serum proteins by electrophoresis is accurate, rapid, inexpensive and simple. It gives a clearer picture of the underlying liver pathology and prognosis.
7. Filter paper electrophoresis should be relied upon more heavily by the clinician in order to detect early liver changes as well as to follow their cases with more of an understanding of what disturbed physiology is taking place.
8. Paper electrophoresis studies should be continued long after apparent clinical recovery has taken place in order to determine whether there is any evidence of pathological physiology.

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President's Message

TWENTY-THREE OCTOBER

On 23 October 1958 the College will again undertake one of its most important annual functions in presenting the Postgraduate Course in Gastroenterology. Few people, probably, will be able to estimate accurately the requisite amount of effort expended over many months by Dr. Louis Ochs, Jr., and his numerous committees to make this course possible. None who attend these sessions,

however, 23-25 October at the Jung Hotel, New Orleans, will fail to appreciate their stimulating character.

As subspecialties go gastroenterology is unusually comprehensive, requiring an active interest in internal medicine, surgery, radiology, biochemistry, physiology, endocrinology, neuropsychiatry and a variety of additional fields of a more limited nature. No one can hope to master all of these fields but modern patient-care often demands the combined efforts of members of several of these special areas of medicine simultaneously. It is the well trained gastroenterologist with his broad background that is best qualified to coordinate what often amounts to a team approach in present day diagnosis and treatment.

It would be impractical, if not impossible, for any of us to attend six or seven specialty meetings throughout the country yearly, but when the highlights of the annual progress in these various divisions have been carefully selected and presented in a convenient period of time by recognized experts the opportunity of keeping abreast of current thinking in gastroenterology should not be missed.

Finally it should be mentioned that this postgraduate course has for some years had a feature unique among all others. Each presentation is evaluated and commented upon for the purpose of re-emphasis or critique by two physicians of great experience and international reputation. Drs. Owen H. Wangenstein and I. Snapper are known to all for their work in surgery and medicine respectively but they are particularly remembered by many of us because they have established an enviable reputation in this graduate form of medical education for the practicing physician.

NEW ORLEANS CALLING

PLEASE COME TO NEW ORLEANS -- WHY?

Because: Our scientific program is a WOW! All sections of our country are furnishing speakers. The whole field of gastroenterology is being covered—we know you'll learn a lot—and will get much material for thought on your postconvention tour.

We feel our Postgraduate course will be particularly interesting for our membership. So, come on and sign up—if you know all the answers, just think how much it will raise your ego, and remember, there will be plenty of time for your discussion and if you have any "pearls" to offer, you can't give them unless you are present at the course.

So please read the advance program and give it your consideration.

Feel young and be a student again for three days.

Sincerely your fellow student,

Louis Ochs, Jr.,
Chairman Program Committee

In Memoriam

We record with profound sorrow the passing of Dr. W. Van Valzah Hayes of Greenwich, Conn., Honorary Fellow and Dr. William Antine, Brooklyn, N. Y., Fellow of the American College of Gastroenterology. We extend our deepest sympathies to the bereaved families.

ABSTRACTS FOR GASTROENTEROLOGISTS

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ESOPHAGUS

DYSPHAGIA DUE TO A LOWER ESOPHAGEAL RING: Douglas G. Cameron, S. R. Townsend and J. W. McKay. *Canad. M.A.J.* 76:1049 (15 June), 1957.

The lower esophageal ring occurs in both sexes and usually in patients over 50 years of age. It is probably common but often overlooked. The diameter of the ring varies from patient to patient but remains remarkably constant in individual patients over several years. It seems to determine whether or not dysphagia will occur. The patients complain of a sudden, intermittent dysphagia. X-ray studies reveal a smooth concentric narrowing in the esophagus situated a few centimetres above the diaphragm. No inflammation, ulceration, scarring or neoplasia is seen at endoscopy. The exact nature of the ring is not known. In one case coming to surgery, muscle layers of the esophagus were not included in a biopsy; in another case coming to surgery, thickening of the muscle layer was demonstrated. This ring is also associated with hiatus hernia in some instances; it needs also to be differentiated from annular contraction (organic).

The method of barium examination is as follows: On a fasting stomach, barium paste is administered with the patient in the prone left oblique position. When the barium reaches the lower esophagus, he is

asked to take a deep breath and bear down (Valsalva maneuver). The lower end of the esophagus is seen to dilate. This is considered a normal ampulla. A symmetrical ring-like narrowing may be seen at the level of the ampulla when the esophagus is well distended with barium. Spot films are then taken. The patient is then given to swallow a large gelatin capsule filled with barium. The passage of the capsule is delayed at the site of the ring, and if this is the case, the patient may be conscious of a sticking, substernal pain relieved when the capsule passes. The entire examination may not succeed when carried out in the upright position. Repeat examination may show that the ring remains unchanged. Endoscopic examination should always be carried out. The nature of the ailment should be explained to the patient, who must eat slowly and chew his food well. Attempts to influence the ring by drug therapy or bouginage are said by Cameron et al not to be successful, so that narrow rings may require plastic surgery, according to these authors.

SAMUEL L. IMMERMAN

SPONTANEOUS RUPTURE OF THE ESOPHAGUS: William K. Swann. Clin. Med. 4:859 (July), 1957.

Spontaneous rupture of the normal esophagus is a surgical emergency. When recognized early and treated promptly by surgical closure, recovery is to be expected. If not operated this catastrophe is almost always fatal.

The diagnosis is suggested by the sudden severe chest pain radiating through to the back and typically follows the act of vomiting. Associated subcutaneous emphysema of the neck and hydropneumothorax make the diagnosis almost certain. It can

be confirmed by aspiration of gastric content or previously ingested methylene blue from the pleural space. Iodized oil may be seen on fluoroscopy escaping into the mediastinum or pleural space. Usually, however, these studies are not necessary.

Given prompt surgical intervention these patients recover. While fluid and electrolyte replacement is being carried out the chest is opened through the bed of the 7th rib.

GLENN S. ROST

STOMACH

FURTHER EXPERIENCES WITH THE VIGOROUS DIAGNOSTIC APPROACH TO UPPER GASTROINTESTINAL HEMORRHAGE: Eddy D. Palmer. Am. J. M. Sc. 233:497-502 (May), 1957.

The author reports on further experiences with the technic of a quick diagnostic approach to the patient with upper gastrointestinal hemorrhage. Two hundred thirty-eight patients were examined with the plan as outlined. The general condition was quickly evaluated, blood was replaced, a rapid history and physical examination were recorded and a number 30 Fr. Ewald tube was passed into the stomach and ice water lavage accomplished. This was followed by esophagogastrosopy and fluoroscopy. In this way, within an hour of admission, the patient had had a physical examination, esophagogastrosopic, gastrosopic and roentgenologic examinations. X-ray examination was only delayed where a state of shock persisted, or where a Sengstaken tube was used for bleeding varices. Identification of the bleeding lesion within a few hours of admission was claimed

in 88.7 per cent of the patients. It is of interest that among the 238 patients reported only 23 per cent bled from a duodenal ulcer and 13 per cent from gastric or stomal ulcer. Fifty-nine per cent of the patients were found at the time of hemorrhage to have an ulcer. It therefore becomes obvious that many bleeding lesions such as erosive gastritis and erosive esophagitis may heal following hemorrhage and a delay in diagnosis leads to the erroneous assumption that an ulcer is responsible for the bleeding. The author stresses that the delay can only lead to more harm than good. A quick accurate diagnosis allows definite treatment. The ice water lavage in itself is credited with slowing or stopping bleeding from erosive gastritis, sclerotic ulcer arteries or esophageal varices.

BERNARD FARFEL

COMPARISON OF SIDE-EFFECTS AFTER PARTIAL GASTRECTOMY AND VAGOTOMY AND GASTROENTEROSTOMY: H. T. Cox and D. F. Kerr. Brit. M. J. 5029:1211 (25 May), 1957.

This paper compares the side-effects in 100 patients who had partial gastrectomy for duodenal or anastomotic ulcer with the side-effects in 100 cases of duodenal ulcer treated by vagotomy and posterior gastroenterostomy. The operations were performed in comparable cases.

There is no material difference in the incidence of biliary regurgitation after partial gastrectomy and that after vagotomy

and gastroenterostomy. The incidence of dumping is less after vagotomy and gastroenterostomy, but the outstanding advantage of vagotomy and gastroenterostomy over partial gastrectomy is in the nutrition of the patient; more patients can eat a normal sized meal, more patients can eat sweets, and fewer patients suffer from indigestion.

ARNOLD STANTON

HIATUS HERNIA: Martin D. Liemer. Med. Times 85:669 (June), 1957.

This article indicates that hiatus hernia is frequently overlooked and the incidence is greater than is usually suspected. There are about 800,000 cases in the United States at present. Etiology and diagnosis is discussed at some length.

A medical regime consisting of weight reduction, avoidance of constricting corsets and abdominal supports, avoidance of straining of stools, and the relief of any cough or vomiting may be quite sufficient to free the patient of symptoms. They are always instructed to sit up at meal time and never lie down soon after meals and in some instances it is necessary that they sleep in a recumbent position. It is felt that a bland, low roughage diet with an avoidance of large amounts of food is of benefit and likewise nonabsorbable alkali

will be helpful in those with normal or hyperacidity. Anemia should be treated and where localized stenosis has resulted, the lower esophagus dilatation will be the most beneficial. It is further stated that surgical repair is not usually required since most of the patients with hiatus hernia are elderly and remain comfortable on the medical regime. In infancy or in the very young, a recurrence of symptoms due to esophagitis makes it imperative that these candidates be considered seriously for surgical treatment to avoid complications of the condition. When this is desired, most surgeons prefer the thoracic approach in which the mortality and morbidity rates are low and recurrences are rare.

L. K. BEASLEY

DUODENAL ULCERS IN CHILDREN: H. M. Goldberg. Brit. M. J. 5034:1500 (29 June), 1957.

The author presents a series of duodenal ulcers in 20 children between the ages of 7 and 15. In infancy duodenal ulcer is an acute condition characterized by rapidly developing pathological changes and showing little tendency to repair with concomitant greater incidence of complications such as hemorrhage and perforation. In older children the disease tends to con-

form more to the adult pattern. Of the 20 children only 5 gave a characteristic ulcer pain picture. In nine the pain was not typical of duodenal ulcer. Five patients gave a history of hematemesis on admission and one was admitted with a perforated ulcer.

LOUIS A. ROSENBLUM

INTESTINES

COURSE AND MANAGEMENT OF HIRSCHSPRUNG'S DISEASE: G. G. Wyllie. Lancet 1:847 (27 April), 1957.

Diagnosis of Hirschsprung's disease in infancy may be difficult because the contrast between the narrow segment and the dilated portion of the large bowel is very slight. A rectal biopsy of the aganglionic segment is the most reliable diagnostic procedure, if this cannot be performed laparotomy may be sometimes required.

Treatment of Hirschsprung's disease at an early age consists of passage of rectal

tubes and sounds followed by saline enemas. Intubation requires great care because of the vulnerable wall. Tap water enemas should be avoided as they may lead to water intoxication. Emergency colostomy and occasionally ileostomy may become necessary. Otherwise, Swenson's operation is the treatment of choice at a later age.

H. B. EISENSTADT

THE ONE-STAGE PROCTOCOLECTOMY WITH ILEOSTOMY: EXPERIENCES AT BROOKE ARMY HOSPITAL: Donald G. Fahy and Warner F. Bowers. Military Med. 120:403 (June), 1957.

The authors favor complete colectomy and ileostomy for the treatment of ulcerative

colitis. They say that anastomosis of the ileum to the colon has been shown to

be almost universally doomed to failure. They list two indications which make colectomy mandatory in their opinion. They are, first, pseudopolyps which forecasts the development of malignancy, and more rarely uncontrolled massive hemorrhage. Other indications are intractability, in which the patient is incapacitated from an economic standpoint; progressive or fulminating disease not yielding to intensive con-

servative measures. Arthritis, and iridocyclitis are other indications.

The technic they use for ileostomy they designate as a surgically matured ileostomy method. It is described in a separate paper of theirs. They claim this method has obviated the previous sequela incident to ileostomy.

SAMUEL L. IMMERMAN

EXTERNAL MANIFESTATIONS OF MULTIPLE POLYPOSIS: Capt. Harold P. Lazar; Capt. Neil S. Crow and Capt. Byron G. Brogdon. *A.M.A. Arch. Int. Med.* 100:290-295, 1957.

The syndrome of familial polyposis, multiple osteomas, and skin tumors has been described by Garner in 1951. Since then a few similar cases have been reported. The osteomas involve all parts of the calvarium, most frequently the maxilla and the mandible; the soft tissue tumors observed in this condition vary, they are epidermoid and sebaceous cysts, fibromas, and diffuse connective tissue masses. The polyposis is

restricted to the colon and has all the characteristics of the familial disorder without associated skin and bone changes. The case of a 25-year old soldier is reported showing the Garner-syndrome, however, there were no other cases in his family. Whenever connective tissue skin tumors or osteomas of the bone are recognized a search should be made for colonic polyps.

H. B. EISENSTADT

A REAPPRAISAL OF THE ROUTINE USE OF NASOGASTRIC SUCTION: David H. Sprong, Jr. and William F. Pollock. *Am. J. Surg.* 94:257 (Aug), 1957.

The routine use of nasogastric suction following ordinary uncomplicated abdominal operations, is so widespread that the preoperative and postoperative care of patients has become a complicated procedure and a most troublesome time for the patients. Most patients do not become obstructed postoperatively, and there should be little need for intubation.

The specific indications for intubation are: 1. mechanical obstruction and 2. ady-

namous ileus severe enough to cause distention and vomiting of significant amounts.

The need for continued suction can best be determined by clamping the tube for a few hours, and giving measured amounts of liquid by mouth. The gastric residual is then measured and the patient questioned as to discomfort during the procedure. From this test, one can tell fairly accurately whether or not further suction is needed.

CARL J. DEPRIZIO

GASTROINTESTINAL POLYPOSIS WITH MUCOCUTANEOUS PIGMENTATION (PEUTZ-JEGHERS SYNDROME): Thomas L. Dormandy. *New England J. Med.* 256:1093 (6 June), 1957; 256:1141 (13 June), 1957; 256:1186 (20 June), 1957.

Twenty-one members of 5 families affected by the Peutz-Jeghers syndrome have been investigated and the cases discussed. The syndrome has become more widely recognized during the past few years. It has three cardinal features: gastrointestinal polyposis, mucocutaneous pigmentation and heredity. In this syndrome, the polyposis, although essentially gastrointestinal, always involves the small intestine, where it may be represented by a solitary polyp,

multiple polyps or diffuse polyposis.

The pigmentation of the Peutz-Jeghers syndrome always affects the buccal mucosa and the lips. The facial spots—grouped mainly around the orifices of the face—are distinctive, but they frequently begin to fade after puberty; they may even be absent. Other sites, especially the palms and fingers, are occasionally involved. Their recognition and differential diagnosis are discussed. The characteristic pigmentation

occasionally occurs without polyposis; 1 such case is reported.

Various disorders and deformities are occasionally associated with gastrointestinal polyposis. They include bladder polyps, bronchial adenomas, nasal polyps, skeletal and cutaneous malformations, heart disease, diverticulosis, retarded development, goiters and ovarian cysts.

Patients with silent polyps in the small intestine require advice but no treatment;

polyps in other parts of the gastrointestinal tract should be looked for, and may require more active measures. Some indications for the surgical treatment of polyps of the small intestine are considered. Reasons are given why operation should not, as a rule be undertaken as an emergency procedure. Resection should be as conservative as possible.

ARNOLD L. BERGER

SURGICALLY MATURED ILEOSTOMIES AND COLOSTOMIES: EXPERIENCES AT BROOKE ARMY HOSPITAL: Donald G. Fahy and Warner F. Bowers. *Military Med.* 120:409 (June), 1957.

The authors review the surgical history of ileostomy and the many unfortunate sequelae incident to this operation. They state that their method of surgically matured ileostomy is ideal. It consists of a full

thickness eversion of the ileum. The method is illustrated by drawings; it is based on the methods of Brooke. The patient uses a Koenig-Rutzen appliance.

SAMUEL L. IMMERMAN

SERUM AMYLASE LEVELS IN EXPERIMENTAL INTESTINAL OBSTRUCTION: John J. Byrne and Thomas F. Boyd. *New England J. Med.* 256:1176 (20 June), 1957.

In recent years, a number of cases of intestinal obstruction have been reported with elevated serum amylase levels, several of which were definitely in the pancreatitis range. Because of the confusion that resulted in some of these cases, a study of the serum amylase in experimental mechanical small-bowel obstruction was undertaken in dogs.

The serum amylase level was elevated in dogs with complete mechanical small-bowel obstruction, either high or low, that were allowed to eat and vomit. This elevation was not due to dehydration, electrolyte imbalance or prerenal azotemia, but was due

to increased intraduodenal pressure. The elevation of the serum amylase may be as high as that seen in experimental pancreatitis in dogs.

The increased intraduodenal pressure induced by obstruction and vomiting may lead to a rise in the pancreatic ductal pressure, which in turn causes a mild interstitial pancreatitis. This was partially confirmed by histologic studies of the pancreas of each experimental animal.

It should be noted that the serum amylase values in dogs are approximately ten times the values in human beings.

ARNOLD L. BERGER

TREATMENT OF ULCERATIVE COLITIS WITH LOCAL HYDROCORTISONE HEMISUCCINATE SODIUM: S. C. Truelove. *Brit. M. J.* 5033:1437 (22 June), 1957.

The investigation concerns the local treatment with hydrocortisone hemisuccinate sodium. It is carried out nightly when the patient would normally be going to bed. The patient applies locally one to two drops of the solution from a bottle to which a rubber catheter is attached, and hung close to the patient's bed. The patient lies in bed, inserts the catheter well into the rectum, turns on the screw clip to start the solution; this slow rate prevents the installation from acting as an enema. When the solution has run in, the catheter is removed

and allowed to drop down into a bottle or basin beside the bed. The patient is able to settle down and sleep well during the night. The treatment consists of 10 to 14 instillations.

In all cases a biopsy was done before and afterwards, and the results showed a rapid remission in 11, an improvement in 1 and no change in 6 per cent of the cases. In some patients the effect was dramatic; the patient became symptom-free after the first installation. The remissions after hydrocortisone hemisuccinate sodium were nor-

mal or close to normal. The best results were shown in the cases with a short history; the longer the disease existed, the poorer was the result.

Altogether only one patient has failed to respond. The best results could be achieved with the combination of hydrocortisone, with an appropriate antibiotic, which will

bring about healing, for there is no mutual interference, either chemical or biological, between the two medications.

The theoretical and practical implications of the findings are well discussed and the optimism of the writer seems to be justified when reviewing the results.

HELMUTH NATHAN

AN UNUSUAL CASE OF ACUTE PORPHYRIA WITH VOLVULUS AND GANGRENE OF THE CECUM. C. J. Watson, R. L. Varco and R. Schmid. *Am. J. Med.* 22:980 (June), 1957.

Abdominal pain and bowel distention are well known features of intermittent acute porphyria. The authors describe an unusual case of combined hepatic porphyria in which volvulus of the cecum nearly resulted in death. It was believed that the volvulus was secondary to disturbed motor func-

tion of the bowel caused by the porphyria. Operation resulted in complete remission. Subsequently mild "*cutanea tarda*" symptoms developed in this patient and the excessive porphyrin excretion persisted two years after the episode of volvulus.

JOHN M. McMAHON

FATAL MASSIVE GASTROINTESTINAL HEMORRHAGE DUE TO MULTIPLE PHLEBECTASIA OF THE SMALL INTESTINE: Sol L. Shandalow. *J. Internat. Coll. Surgeons* 27:690 (June), 1957.

To the more familiar causes of gastrointestinal hemorrhage the author calls to our attention the cases he has observed in which fatal massive gastrointestinal hemorrhage has resulted from multiple phlebeectasia of the small intestine. Multiple phlebeectasia of the small intestine are not common. Although the condition is a rarity

nevertheless when it is possible either clinically, by x-ray or by laparotomy to exclude the common causes for intestinal bleeding, thought should be given to the possible presence of ruptured small venous varicosities of the intestine as a source for massive bleeding.

BERNARD J. FICARRA

EXFOLIATIVE CYTOLOGY OF THE COLON AND RECTUM: D. J. Oakland. *Brit. M. J.* 5032:1391 (15 June), 1957.

The author describes his experience with exfoliative cytology of the colon and rectum. The collection of a suitable specimen is divided into two categories. For lesions in the proximal colon, cecum, transverse colon, etc., and lesions generally beyond the reach of the sigmoidoscope, it is necessary to examine the returned fluid after an enema of Ringer's solution. For lesions within reach of the sigmoidoscope, the author devised a special atomizer-like apparatus for collecting washings. Laxatives were not used; the patient had an enema the day before sigmoidoscopy. After the addition of 90 per cent alcohol and a few drops of Meyer's egg albumin, the specimen was centrifuged and stained with Papanicolaou Stain EA65.

Twelve cases of carcinoma of the colon, the diagnosis of which was confirmed at

operation, are tabulated. If we term the author's method the "low collection method", the results by this method were as follows: In two cases of carcinoma of the cecum, correct (cytological) diagnosis are: two cases transverse colon, correct diagnosis one; eight cases of carcinoma of the sigmoid, correct diagnosis seven. If this group of 12 cases is further combined with 19 other cases, there was one of false positive cytological diagnosis. In this report will be found further details of technic and a historical review of the findings of other workers in this field. The author remarks that the cytological diagnosis of malignant lesions within reach of the sigmoidoscope appears to be a practical proposition, but it is doubtful if this technic has any advantage over biopsy.

SAMUEL L. IMMERMAN

ADENOMATOUS POLYPS OF THE GASTROINTESTINAL TRACT: Francis P. Catanzaro and Anthony Merlino. Rhode Island M. J. 40:333 (June), 1957.

The authors' clinical material is relatively small and the statistical evaluation may be limited; it may help for the general review of the entire question of the polyps of the intestinal tract.

The symptomatology of bleeding is described; irregularities of bowel movement and sometimes pains. Most frequently, in 65 per cent, the polyps were found in the rectum, then follows the sigmoid and the descending colon. Twenty-five of 49 pa-

tients had malignant polyps. The x-ray diagnosis is of greatest value, especially in lesions which cannot be palpated with the index finger.

The treatment of the polyps consisted of excision in 34 patients or 69 per cent, a resection was done in 10 cases or 20 per cent, fulguration in 3 cases or 6 per cent, and no procedure in 2 cases or 4 per cent.

HELMUTH NATHAN

LIVER AND BILIARY TRACT**TREATMENT OF STONE IN THE COMMON BILE DUCT: John Hosford. Brit. M. J. 5029:1202 (25 May), 1957.**

An anastomosis of the common bile duct to the duodenum gives good results with freedom from symptoms afterwards. It is valuable in cases in which there are recurrent stones or biliary mud in a thickened dilated common duct after previous operations. This operation is not advisable when

the common bile duct appears healthy, even though it contains stones. This operation has been performed in 21 cases. Some points in the technic of the operation are presented in detail.

ARNOLD STANTON

AN OUTBREAK OF INFECTIOUS HEPATITIS IN TWO ARCTIC VILLAGES: Thomas R. A. Davis. New England J. Med. 256:881 (9 May), 1957.

This article, actually a public health study, describes the epidemiologic investigation of an outbreak of infectious hepatitis in two Alaskan villages on the Bering Sea. The sanitation and hygiene practices in Alaskan villages are such that transmission via water could easily occur.

The characteristics of this outbreak of infectious hepatitis in the Arctic are described. The relations between the geo-

graphic distribution of cases, the human contamination of the sources of water supply and the explosive nature of the epidemic are propounded as reasons for the conclusion that this particular outbreak was the result of a fecal-oral mode of transmission with water acting as the causative agent vehicle.

CHESTER S. SVIGALS

DUPLICATION OF THE CYSTIC AND COMMON HEPATIC DUCTS, LINED WITH GASTRIC MUCOSA: C. Marshall Lee, Jr. New England J. Med. 256:927 (16 May), 1957.

Structural variations of the extrahepatic biliary tract are extremely common and account for some of the technical accidents during operations in this region. True developmental anomalies are more unusual, and consist of double organs, or duplication of portions of organs. This is a case report of a 13-year old boy who had attacks of epigastric pain and jaundice, enlarged liver and spleen, and negative

cephalin flocculation test. Exploration revealed duplication of the cystic and common hepatic ducts, the mucosa being lined with gastric epithelium. The symptoms were due to compression of the common hepatic duct by the mass, and were relieved by the operation, which is described in detail.

ARNOLD STANTON

OBSERVATIONS OF LIVER FUNCTION IN CHLORPROMAZINE-TREATED ALCOHOLIC PATIENTS: M. D. Small, A. E. Longarini and N. Zamcheck. *New England J. Med.* 256:932 (16 May), 1957.

No jaundice or serious impairment of liver function was noted after the chlorpromazine (thorazine) treatment of 500 "Skid Row" alcoholic patients, at dosage levels of 60 to 180 mg. per day. The acute drinking episode and associated abnormal-

ity of liver function did not appear to predispose these alcoholic patients to chlorpromazine jaundice. The authors conclude that chlorpromazine is safe to use in alcoholic patients.

ARNOLD STANTON

CARCINOMA OF THE AMPULLA OF VATER: Eli T. Samet and Francis H. Straus. *Illinois M. J.* 111:249 (May), 1957.

The authors present a table which gives the differential diagnoses between carcinoma of the ampulla and carcinoma of the pancreas. In one series of cases only 29 per cent showed a deformity of the papillary area. The original optimism concerning the block resection of the head of the pancreas, the lower common duct and the duodenum seems not to be justified by the number of 5-year cures. More radical extensions of this operation have been devised and these

operations too must be evaluated. Local excision of the tumors is not fruitful. Palliative operation is helpful in the relief of pain and the removal of obstruction to biliary drainage. A case report is given in which the patient died from the complication of erosion of polyethylene tube through the intestinal wall with escape of intestinal contents.

PAUL B. VAN DYKE

MANAGEMENT OF THE PATIENT WITH ACUTE CHOLECYSTITIS: Willard Bartlett. *Mississippi Valley M. J.* 79:141 (May), 1957.

In patients with gallbladder colic it is imperative that the associated pain be relieved because the pain is severe and results usually from an impaction of a stone in the cystic duct. Peritoneal irritation may or may not be present immediately in acute cholecystitis. When the tenderness does extend beyond the gallbladder area then one suspects that the peritoneal irritation has commenced. Empyema of the gallbladder is the most frequent complication of acute cholecystitis. If there is empyema of the gallbladder with or without a limited area

of gangrene, cholecystostomy is invariably the procedure of choice. The author advocates a two-stage procedure when the common duct must be explored. The operator who is not prepared to carry out an extensive resection for ampullary duct carcinoma or a similar formidable procedure should avoid in every possible way inducing a complication which renders more difficult the work of the surgeon to whom the patient is referred for definitive operation.

BERNARD J. FICARRA

POSTOPERATIVE CARE FOLLOWING SURGERY OF THE BILIARY TRACT: Theodore S. Raiford. *North Carolina M. J.* 18:198 (May), 1957.

Following biliary tract surgery the postoperative management is essentially the same as with any major abdominal procedure except that very little can be taken for granted. Every organ and system of the body from the chest to the extremities can be affected in complications.

The genitourinary, electrolytic, peripheral vascular and antibiotic problems are not too different from those of other major operative procedures, but the hepatic and pancreatic complications may be quite for-

midable, not to speak of the surgical sequelae per se hemorrhage, bile peritonitis, biliary fistula, stricture of bile ducts and the postcholecystectomy syndrome.

Hence, postoperative management in this type of surgery assumes equal importance with pre- and postoperative procedures. A good medical knowledge of the use of drugs can be of great value, but the casual use of drugs can serve very little.

A. M. SUSINNO

CHOLEDOCHAL CYST WITH A REPORT OF AN INTRADUODENAL CYST: Col. Lee S. Serfas, M.C. and Lt. Col. Clinton S. Lyter, M.C. Am. J. Surg. 93:979 (June), 1957.

Choledochal cyst is an idiopathic dilatation of the common bile duct, probably congenital in origin. Vater described the first case of choledochal cyst in 1723. The dilatation may involve only the common duct, or it may also involve the common hepatic duct, so that the cystic and hepatic ducts enter the cyst as separate ducts, separated by cyst wall.

The clinical triad is that of abdominal pain, tumor and jaundice. One of the most striking features is the chronicity and intermittency of the clinical course. Intravenous cholangiograms should be very helpful in diagnosing choledochal cyst in spite of the fact that visualization is not

obtained in a large percentage of patients with jaundice. Flat films of the abdomen, gastrointestinal series, and barium enemas may reveal a typical displacement, if the mass is large enough. The pylorus and the first portion of the duodenum are displaced anteriorly, downward, and to the left. The treatment of choice is primary anastomosis between the cyst and the intestinal tract. In the case report given, it is unusual in that the cyst was located within the lumen of the duodenum and actually represented a diverticulum of the ampulla of Vater. The patient was operated upon and recovered.

CARL J. DEPRIZIO

INTRAHEPATIC CALCIFICATION: Robert Bruce. Brit. M. J. 5031:1343 (8 June), 1957.

The author presents a report of a case showing intrahepatic calcification and then goes on to discuss the various causes of this relatively rare condition. The following are then discussed in detail: 1. Hydatid disease; 2. Hepatic abscess; 3. Gummatous calcification; 4. Calcified hepatic cysts; 5. Hemangiomas and lymphangiomas; 6.

Calcified tuberculoma; 7. Primary neoplasms of liver; 8. Secondary metastatic deposits; 9. Hepatic calculi and 10. Other causes such as: Hodgkins' disease, chronic renal disease, diabetes mellitus, eclampsia and disease with bone destruction may all show areas of liver calcification.

ALEXANDER ZABIN

A STUDY OF HOST-PARASITE RELATIONSHIP IN LOA LOA: William R. Felts and Edmund J. Talbott, Am. J. Med. 22:995 (June) 1957.

A 20-year old female patient obtained a Loa Loa infestation while residing in French Equatorial Africa. She was seen by the authors almost 17 years later and she had noticed a crawling and itching sensation in various skin areas and sometimes short reddish wavy lines in the skin representing visible mature filariae. In addition Calabar swellings around the joints had occurred during this period of time. Clinical examination was negative except for the demonstration of microfilariae in blood films, especially when blood was taken during the noon hours. Hetrazan treatment was started and was immediately followed by cardiac, renal and hepatic changes and

urticaria. Hepatitis was observed with hepatomegaly and abnormal liver function tests. All symptoms reappeared within a few days in spite of continuation of treatment with increased dosage. After elimination of the microfilariae, hetrazan was replaced by Suramin, a drug affecting the adult filariae. A similar general reaction with hepatitis, carditis and urticaria was observed; however the patient responded dramatically to cortisone. The authors did not attribute the attacks to drug toxicity but to an altered host-parasite relationship with antigen antibody reaction.

H. B. EISENSTADT

OBSERVATIONS ON AN OUTBREAK OF INFECTIOUS HEPATITIS: Major Alois Peczenik and David W. Duttweiler, A.M.A. Arch. Int. Med. 100:101, 1957.

Infectious hepatitis is a contagious disease that can lead to an outbreak of an

epidemic. This fact is frequently not realized by the physician who treats a single

case. The epidemic character is somewhat obscured by the relatively long incubation period. Therefore, a small epidemic of 21 cases collected in retrospect is reported by the authors. Prompt administration of 3 c.c. of immune serum globulin to all persons of intimate contact would have prevented several of these cases. In addition, the patients were treated either as out-patients or hospitalized for a very short period of time.

Good isolation facilities were not available in the hospital and the nursing technic was not sufficient to prevent spreading of the disease. It is advisable to keep the patients in strict isolation for about 4 weeks, or until such time as the serum bilirubin and the BSP test have become normal, or at least are greatly improved.

H. B. EISENSTADT

PANCREAS

THE DIAGNOSIS OF ACUTE PANCREATITIS: Henry Wapshaw: *Proc. Roy. Soc. Med.* 50:396 (June), 1957.

Forty cases were seen and studied. Twenty-six were severe and 12 died; 14 were mild and one died in this group. The diagnosis was suspected on admission in only 50 per cent of the group. There were more than twice as many females than males and the age group was from 40-60 years. Fifteen patients had prior episodes of abdominal pain. Pain was usually intense, gripping and paroxysmal. It was most often located in the supraumbilical area and radiated to the back in 50 per cent of the cases. Cyanosis occurred in nine. None of the cases demonstrated the Cullen-Grey Turner sign. Ten were slightly jaundiced.

Maximum tenderness was usually in the supraumbilical or right subcostal areas. In ten cases a mass was palpable and thought to be edematous omentum and mesentery. Albuminuria was constant. Seven had glycosuria. Serum amylase was usually elevated the first two days, but it must be remembered that morphine can give a false elevation. Urinary amylase may be deceptive if nephritis is present since it will not rise as expected at these times. Serum calcium is decreased on the third day if widespread fat necrosis occurs.

STANLEY STARK

PATHOLOGY AND LABORATORY RESEARCH

HEMATEMESIS AND MELENA COMPLICATING TREATMENT WITH RAUWOLFIA ALKALOIDS: Leo E. Hollister. *A.M.A. Arch. Int. Med.* 99:281, 1957.

Increased gastric acidity and motility following administration of Rauwolfia preparations for the treatment of hypertension or mental diseases is well known; nausea, anorexia, vomiting and diarrhea may also occur due to the cholinergic effect of the drug. Activation of peptic ulcers has been recorded. Three patients are reported with severe hematemesis and melena following

moderate dosage of various Rauwolfia extracts. No hematologic abnormalities could be detected, however. Serotonin depletion might play a role in favoring a bleeding tendency. Exacerbation of existing ulcer and formation of acute gastric erosions were thought to be the causes of these bleedings.

H. B. EISENSTADT

THE THERAPEUTIC INDEX OF JB 323 (PIPTAL) IN PEPTIC ULCER: Julius Pomeranze and Raymond J. Gadek. *Am. Pract. & Digest. Treat.* 8:73 (Jan.), 1957.

The therapeutic effect of JB 323 (Piptal), a new synthetic drug with anticholinergic activity, was investigated in the management of peptic ulcer. It was demonstrated in human volunteers that 1½ to 5 times the recommended daily therapeutic

dose could be administered without the usual side reactions of anticholinergic therapy. This drug significantly depressed the motility of the hypermotile stomach. It had no significant effect on the bowel transit time of normal cases or those with peptic

ulcer. Further, it did not significantly depress gastric motility in the presence of otherwise normal gastric motility patterns.

The authors conclude that Piptal is of great value in the management of peptic

ulcer inasmuch as its clinically effective therapeutic dose is well below that required to produce side reactions.

CHESTER S. SVIGALS

COBALT-60 TELETHERAPY FOR COMPLICATED PEPTIC ULCER: Charles H. Brown and Robert A. Hayes. Cleveland Clin. Quart. 24:17 (Jan.), 1957.

The authors present a preliminary report on the use of cobalt-60 teletherapy, on 15 patients having complicated peptic ulcer. They feel that cobalt-60 therapy has major advantages, among them a skin-sparing effect, no erythema resulting from the dosage employed. The 15 patients selected had not responded to previous medical treatment, had evidence of complications or intractability, and were considered possible candidates for surgery.

Teletherapy was employed in these patients concurrently with a medical regime. Gastric analyses were obtained before and after irradiation in 14 of 15 patients. Thirteen of the 14 had an appreciable reduc-

tion in gastric acidity, greater than 32 per cent. Nine had a reduction of more than 75 per cent. Progress roentgen examinations were made on 13 patients, and showed disappearance in each of the ulcer craters. Side-effects were minimal, only three patients showing nausea, but no vomiting. Follow-up studies were made from 2 to 16 months after therapy.

The authors believe that this limited series indicates the desirability of further use of cobalt-60 teletherapy as an adjunct to the treatment of patients with peptic ulcer resistant to other medical regimes.

JOHN N. DILL

AMBULATORY DRIP TREATMENT OF PEPTIC ULCER WITH NULACIN TABLETS: Asher Winkelstein. Am. Pract. & Digest. Treat. 8:268 (Feb.), 1957.

The author outlines a method of application of simulated continuous intragastric drip for the ambulatory patient. Thirty-three patients make up the series, including 22 with duodenal ulcer, 2 with gastric ulcer, 17 with hiatus hernia with esophagitis, one with gallstones, and one with chronic gastritis. A liberal ulcer diet was employed. The method utilizes a slow-dissolving buccal tablet containing milk solids and alkalis, placed in the mouth between meals, and after the evening meal; this was allowed to dissolve slowly, usually

requiring about 30 minutes. Symptomatic response with reference to heartburn, sour eructation, and even pain was good. Thirty patients became asymptomatic. Radiographic studies on the rate of healing, and studies of gastric acidity after prolonged therapy are not included. Gastric acidity was markedly reduced in studies made at the initiation of therapy. The author suggests further utilization of this method in the ambulatory treatment of symptomatic peptic ulcer.

JOHN N. DILL

INFLUENCE OF HYDROCHLORIC ACID ON GASTRIC SECRETION AND EMPTYING IN PATIENTS WITH DUODENAL ULCER: J. N. Hunt. Brit. M. J. 5020:681 (23 Mar.), 1957.

Twenty-seven volunteer students acted as controls and 16 patients with duodenal ulcer without pyloric stenosis were observed in this experiment. The findings failed to reveal any evidence of abnormally rapid emptying in patients with duodenal ulcers. In normal subjects, the more the secretion of acid in response to a control meal, the more effective was added acid in slowing the emptying time. A similar effect

was noted with duodenal ulcer. The author feels that the increased secretory responsive patients with duodenal ulcer coupled with this finding suggests that the emptying time is slowed more in proportion in patients with duodenal ulcers. In response to the control meal, patients with duodenal ulcer had twice the output of acid, chloride and pepsin.

BERNARD FARFEL

BOOK REVIEWS FOR GASTROENTEROLOGISTS

THE AMERICAN FLUORIDATION EXPERIMENT: F. B. Exines, M.D. and G. L. Waldbott, M.D. Edited by James Rorty. 277 pages. The Devin-Adair Company, New York, N. Y., 1957. Price \$3.75.

The authors of this book on fluoridation oppose the use of fluorine in municipalities because of various secondary manifestations which they encountered after prolonged drinking of artificially fluoridated water. To prove their case, they cite one of a patient who developed severe backache, abdominal pain, nausea and marked flatulence, mouth ulcers, pain and numbness in arms and legs and partial palsy in arms, extreme exhaustion and mental deterioration, beginning changes in the retina and hemorrhage from the bladder.

After stopping the use of fluoridated water, the symptoms gradually subsided and after two years, the patient has been in perfect health.

In order to prove their theory and to substantiate the diagnosis that sodium fluoride ingestion was the cause of the patient's previous ailment, an injection into the skin of 1/10 c.c. of a 1:100 solution of sodium fluoride (1 mg.) was given and within ½ hour after the injection, a red streak developed along the arm, the patient complained of almost similar symptoms as de-

scribed above.

To further test the effect of fluorine, about 10 months later 15 mg. of sodium fluoride in 300 c.c. of water was given to the patient on an empty stomach. Within 10 minutes, her face became flushed and she developed a severe attack of migraine, nausea, a sensation of flashing lights in both eyes, pain in the arms and legs, cramps, diarrhea, and a swelling of salivary and parotid glands, features which had been present during her illness two years previously.

Further tests carried out in other individuals resulted in similar symptoms. When saline solution was used as a test, no manifestations occurred.

It is interesting to note that the diagnosis by one of the consultants was hyperparathyroidism and hyperventilation tetany, conditions which closely resemble fluoride poisoning.

The reviewer suggests that reading the entire book and especially page 169, will aid the physician in recognizing fluoride poisoning.

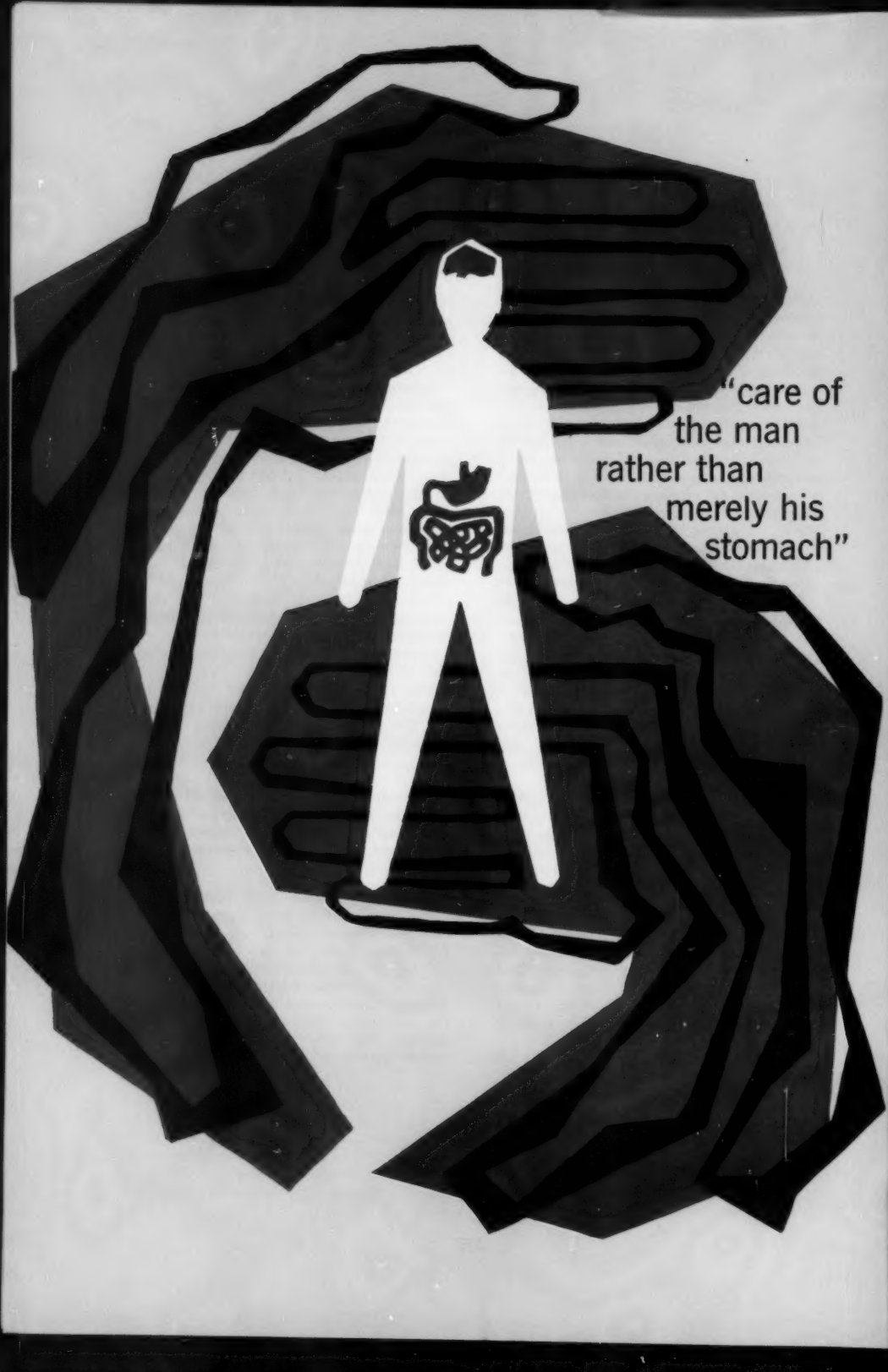
OFFICE GASTROENTEROLOGY: Albert F. R. Andresen, M.D., Clinical Professor Emeritus of Medicine, State University of New York College of Medicine at New York City; Attending Physician, Long Island College Hospital; Area Consultant in Gastroenterology, Veterans Administration. 707 pages, 110 illustrations. W. B. Saunders Company, Philadelphia, Pa., 1958. Price \$14.00.

Dr. Andresen needs no introduction to the medical profession. He is an outstanding clinician and gastroenterologist associated with his Alma Mater. "Office Gastroenterology" is written more for the medical student and general practitioner than the specialist in this field. It is clear, concise and readily understandable. The printing and illustrations are explanatory.

In addition to diseases of the stomach and intestine, Dr. Andresen covers the rec-

tum, liver and biliary tract, pancreas, gastrointestinal tuberculosis, syphilis, mycotic diseases, cardiovascular, respiratory and genitourinary diseases producing reflex or simulating gastrointestinal dysfunction.

An adequate index completes the volume. Medical students and physicians will find Dr. Andresen's "Office Gastroenterology" a valuable and handy desk reference. It is highly recommended.



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1. Reeves, R. J.: Southern M. J. 60:1277 (Nov.) 1957.

2. Shehadi, W. H.: Am. J. Gastroenterol. 28:236 (Sept.) 1957.

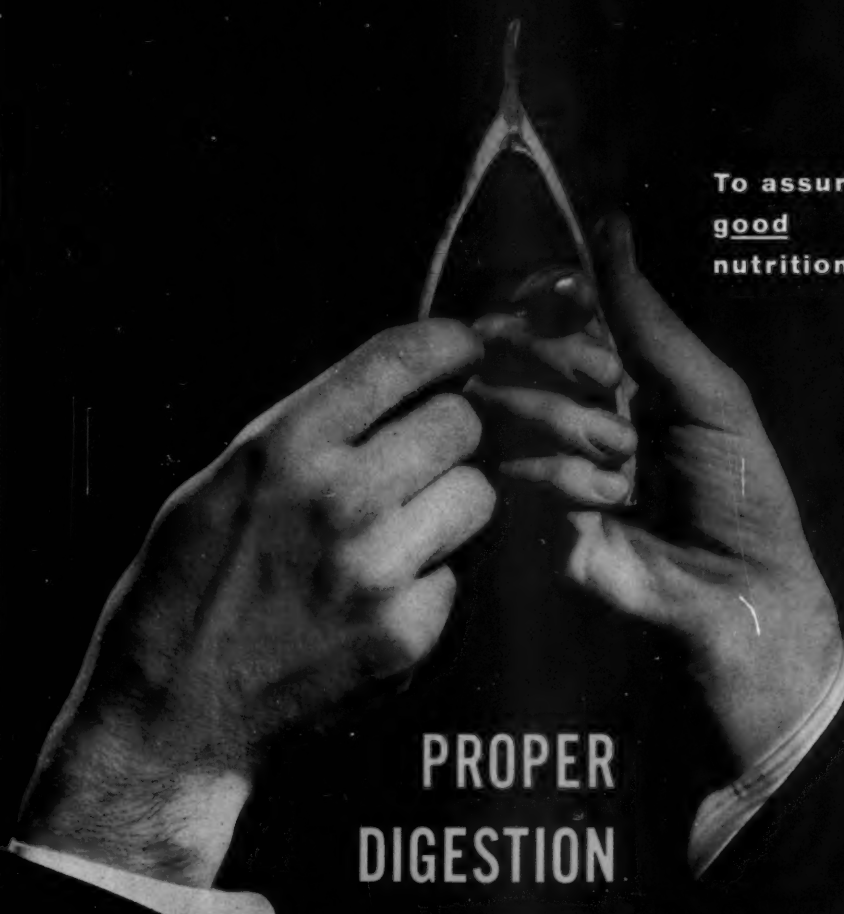
3. Sachs, M. D.: J. Internat. Col. Surgeons 27:681 (June) 1957.

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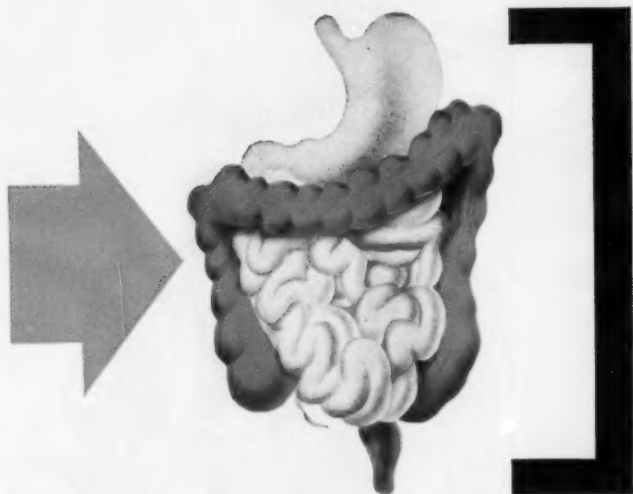
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(1) Kleckner, M. S., Jr.: J. Louisiana M. Soc. 108:359, 1956. (2) Riese, J. A.: Am. J. Gastroenterol. 28:541, 1957. (3) Settel, E.: J. Am. Geriatrics Soc. In press. (4) Jefferson, N. C., and Necheles, H.: J. Urol. 76:651, 1956. (5) Necheles, H., and Kirshen, M. M.: The Physiologic Basis of Gastrointestinal Therapy, New York, Grune & Stratton, Inc., 1957, p. 88.



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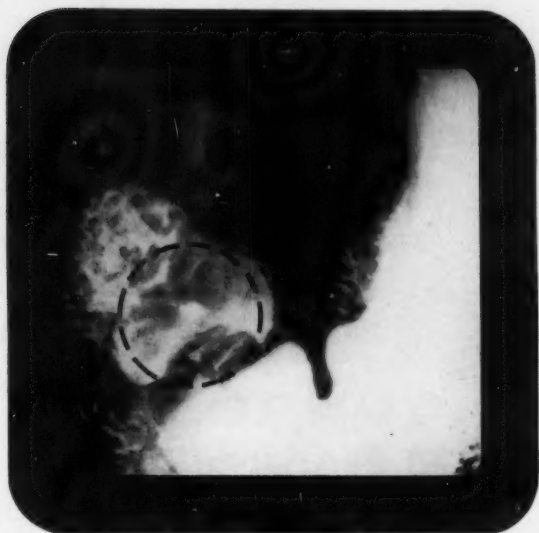
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I. Breidenbach, L., and Secor, S. M.: Proper Handling of the Colostomy Patient, Amer. J. Surg. 93:50, 1957.

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